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The Effect of the Use of the Simulation Leadership Training Software VLeader on the Leadership Aptitude Scores of Undergraduate College Students in the Communications Media Program at Indiana University of Pennsylvania

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Title: The Effect of the Use of the Simulation Leadership Training Software VLeader on the Leadership Aptitude Scores of Undergraduate College Students in the Communications Media Program at Indiana University of Pennsylvania

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The traditional classroom experience in higher education is evolving. The number of college students taking at least one online course is growing. This change is forcing educators to reevaluate their teaching goals and choose appropriate educational tools to accomplish those goals. One of the most popular new tools for the virtual classroom is digital educational simulations. Researchers have been studying the use and effectiveness of simulations in education for decades. Today, advances in technology have made digital (or computerized) simulations even more popular due to their ability to use multimedia tools to dramatically simulate real world environments. The focus of simulation research in the future is centered on the actual effectiveness of these simulations to achieve educational objectives. This study utilizes award-winning, educational leadership simulation software VLeader in order to test the effects of leadership simulation training on the leadership aptitude test scores of college undergraduate students. The amount of practice time spent on the simulator is also used to discuss test performance. Finally, the effect of the simulation training software on demographic groups including: gender, age, class rank, and GPA are discussed.

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CHAPTER ONE

INTRODUCTION

From picking the next president of the United States to picking a team captain for a friendly, neighborhood, football game, human beings look to their leaders to pave the way for individuals to work together and accomplish goals. Studies have shown that leadership is the most often requested skill that employers look for when hiring college graduates (Freifeld, 2013; Sodhi & Byung-Gak, 2008). But where will future leaders develop and practice their leadership skills? This is an important question in higher education as the college classroom experience is evolving. Traditionally, many of the social interactions between students happened face- to- face in the classrooms and on campus. These classroom interactions and social meetings were ideal environments where undergraduate students were able to practice their leadership skills by participating in group projects in the classroom and extra-curricular activities on campus such as: clubs, fraternities, sororities, committees, sports teams or student government.

Those interactions are beginning to disappear as the number of U.S. college students taking at least one online course reached 6.7 million students in 2012 (Allen et al., 2013). With the growth of distance education utilizing the Internet or other e-learning tools, interpersonal and leadership skills have become more difficult to practice as students are no longer physically in the same location when they take classes. Instead, they use their computer from home rather than traveling to or living on-campus for classes. To continue to provide society and employers with graduates who posess advanced leadership skills, institutions of higher education are looking for other educational tools to teach and practice leadership skills.

In this study, the researcher tested the effectiveness of a leadershp simulation training software to improve the leadership aptitude scores of college undergraduate students. If effective, this type of educational technology could be used by colleges and universities in the future to provide all students with an appropriate opportunity to improve their leadership skills whether they choose an e-learning option from a distance or the traditional, on-campus, undergraduate experience.

Statement of the Problem

Our society needs leaders to run governments, businesses, churches, clubs, and every other group where people are trying to accomplish a goal. In one study, (Ghannadian, 2013) 80% of the employers interviewed listed leadership skills as the most important thing they wanted from the next person they hired. The development of leadership in business has become a strategic requirement (Fulmar & Goldsmith, 2000). Business goals can be as simple as keeping a small organization running each day or as complicated as expanding a large corporation into another market. Goals can also give people hope; and that is true whether the goal is for a few people to survive for one more day in a hostile environment or if the goal is to lead a research team to find a cure for cancer which will change the lives of millions of people. Success is achieved when leaders know how to motivate people to work together to accomplish a commmon goal (Tead, 1935).

Teaching leadership skills is important. A study done by Kim, Cho & Jin (2005) showed that problem-solving skills improve over time while leadership skills do not. Leadership skills are improved through practice (Nyman, 2006). But helping students practice their leadership skills is getting harder to do. While teaching leadership skills has been one of the long standing goals of higher education (Greenwald, 2010), the way students communicate with one another is changing. Students coming to colleges and universities are walking through the door with more technology skills than interpersonal communication skills. They are using cell phones to communicate with

their peers who are literally sitting next to them in the classroom (Tindell & Bohlander, 2012). Employers are asking for employees with stronger communication skills and more advanced leadership skills (Ghannadian, 2013) at the same time that students are asking for more e-learning opportunities (Ebersole, 2004). Future trends indicate that undergraduate students will spend more time using distance education or e-learning and less time on campus and in the classroom (Allen et al., 2013; Goral, 2004). If college professors are going to teach their students to become better leaders, they are going to need more tools to reach out to their students who are technologically skilled and who are demanding more virtual classrooms.

In this study, the researcher used an educational leadership simulation training program to attempt to improve the leadership aptitude scores of undergraduate students. As computer technology has grown in the last few decades, a variety of researchers have explored the educational benefits of using digital simulations. Gee (2007), Aldrich (2004, 2005), Au (2008) and Boellstorff (2010) have written about the value of simulations to teach those skills which are improved through experience. It is also their view that the use of educational simulations will continue to grow in the future.

The use of simulations in education is consistent with a constructivist viewpoint which argues that learning is constructed as the learner develops his/her understanding through experience and reflection (Kiggins, 2005). Constructivists such as Piaget (1997), Kolb (1984), and Vygotsky (1986) explored the development of learning in human beings and the importance of experience in learning. A brief summary of the theories of each of these theorists (and others) will be included in the review of literature in chapter two of this dissertation.

Based on the increase in the use of virtual classrooms, there is a need for new tools to help students practice leadership skills. Simulation technology promises the opportunity for students to

practice skills over and over. In theory, these two current topics in the field of instructional technology seem to fit together perfectly. This study was designed to test the effectiveness of using a leadership simulation training software to improve students' leadership aptitude scores.

Research Questions and Hypotheses

The purpose of this study was to investigate whether the educational leadership simulation software, VLeader improved the leadership aptitude scores of undergraduate college students who took the training. To test this, an experiment was conducted using a control group which did not take the training and an experimental group which did take the training. Three sources of data were collected during this experiment. First, all participants were given a leadership aptitude test at the beginning of the study and again at the end of the study. This aptitude score was used to compare the pre-test and post-test scores of each participant as well as comparing the scores between the control group participants and the experimental group participants.

Secondly, each participant was asked to answer some general demographic questions which would be used to see if the training worked better for any specific demographic group than it did for others. For example, do students with higher grade point averages respond better to the leadership training than students with lower grade point averages? Do males respond better to the computer-based leadership training than females? Do older students respond better to the training than younger students? The researcher was also looking to see if older students or students who had higher grade point averages would perform better on the training due to their attitude toward learning and willingness to spend time learning the system. Any demographic groups which responded well to the training would be of interest to educators who might be looking for effective methods to teach leadership skills to specific groups of students or to researchers doing research on this topic in the future.

Third, the Simulearn company provided the scores and time information from each student who completed the VLeader training. This information was used to determine if students who spent more time in the program practicing their leadership skills would perform better on the leadership aptitude test given at the end of the training. The research questions and hypotheses the researcher used to design the study and analyze the results of the study are listed in the next section of this chapter.

Research Questions

The main question of the study testing the effectiveness of the treatment is based on the pre-test and post-test leadership aptitude scores.

RQ1: Does completing the leadership simulation training program VLeader improve the leadership aptitude scores of undergraduate college students?

To answer this question, the first hypothesis will examine whether there is a statistically significant difference in the leadership aptitude scores between the participants in the control group and the participants in the experimental group before the treatment. The second hypothesis seeks to determine any historical or procedural effects by comparing the pre-test and post-test leadership aptitude test scores of the control group. The third hypothesis will address the main research question by comparing the pre-test and post-test scores of the experimental group to check for any statistically significant difference in leadership aptitude scores after the treatment.

H1.1: There is no significant difference between the pre-test scores of the experimental group and the pre-test scores of the control group.

H1.2: There is no significant difference between the pre-test scores of the control group and the post-test scores of the control group.

H1.3: There will be a significant increase between the pre-test and post-test scores of the students in the experimental group.

The next research question and hypotheses are based on the demographic information which was collected from the study participants.

RQ2: Does completing the leadership simulation training program VLeader improve leadership aptitude scores based on demographic differences of the students?

H2.1: There is a significant difference in the change in the pre/post leadership aptitude scores of the students in the experimental group based on gender.

H2.2: There is a signifiant difference in the change in the pre/post leadership aptitude scores of the students in the experimental group based on age.

H2.3: There is a significant difference in the change in the pre/post leadership aptitude scores of the students in the experimental group based on class level (junior/senior).

H2.4: There is a significant difference in the change in the leadership aptitude scores of the students in the experimental group based on their GPA.

The last research question and hypothesis uses information collected by the Simulearn Company about the students in the experimental group who took the VLeader Training. This information included the amount of practice time the students put into the training.

RQ3: Is there a difference in the leadership aptitude scores of the students in the experimental group based on time spent using the simulation?

H3.1: There will be a difference in the leadership aptitude scores of the students in the experimental group based on time spent using the simulation.

These research questions and hypothesis are discussed further in Chapter Four in the Findings section of this study. In that chapter, the results of the experiment are summarized and each of the research questions are answered.

Definition of Terms

The following terms are defined below to insure that the intended meaning of their use in this paper is clear for all readers. In many ways, the field of study for the educational use of software simulations is new and many of the terms are used in different ways by different researchers. This list will clarify the intended meaning of each term, as it is used, in this research.

Asynchronous e-learning

A content teaching method, which does not involve anyone else to participate in real time with the student is asynchronous e-learning. It is student-centered and is often used in distance education. Most asynchronous e-learning is based on textbooks or workbooks which have been made into web pages (Aldrich, 2004).

Computer-based training (CBT)

Any instruction which is primarily delivered to the student through the use of a computer is called computer-based training. The most common format for CBT is a frame-based instruction involving the computer managed presentation of information followed by questions to the learner. Those questions help the instructor determine if the learner is ready to move on or if the lesson needs to be repeated (Towne, 1995).

Constructivism

A learning theory that states learning is an active process where the student learns through practice and experience is called Constructivism. As the learner develops his (or her) understanding of new information, he uses the information he has already learned to create his own body of

knowledge and understanding that changes and expands over time. Skills that can be practiced are often taught using the constructivist learning theory since the students are able to learn by doing (Kiggins, 2005).

Digital Role-Play Simulation

A form of experiential learning that uses a role-play game over a digital delivery system is a digital role-play simulation. This type of simulation is designed so the student is a participant in the simulation rather than the director of it. Students are able to make decisions and see what happens over time based on their decisions (Cohen, et al., 2006).

Educational Simulations

A variety of selectively interactive, selectively representational environments which can provide highly effective learning experiences for students are educational simulations. These simulations teach cyclical patterns and systems as well as linear content. Educational simulations include not only the pure modeling elements of simulations but two other elements: game elements and pedagogical elements (Aldrich, 2005).

Game Elements

Entertaining parts of games, which can be incorporated into education to engage students, are game elements. These include receiving rewards, gaining rank or reputation, or solving a puzzle. Elements which provide familiar and entertaining interactions increase the enjoyment derived from the educational experience and keep learners playing and learning (Aldrich, 2005).

Leadership

The skill of being able to share a vision with others and guide them into working together to achieve a shared future goal is leadership. Leadership power can affect how well a leader is followed by others. It can be based on personal power and influence including leadership power

emanating from money, rank or power over others. The leadership power can also be based on knowledge and expertise in a specific field. Leadership is a combination of skills which allow an individual to get something done through the efforts of others (Tead, 1935).

Leadership Aptitude Test

The Whetten Cameron Leadership Aptitude Test used in this study was created by researchers David Whetten and Kim Cameron at Brigham Young University. It was first published in their leadership textbook "Developing Management Skills" which was originally published in 1984 by Prentice Hall Publishing. The text and test have been so popular that they have been updated eight times; the 8th edition was published in 2011 (Whetten & Cameron, 2011).

Multimedia

In education, multimedia is commonly used to mean the incorporation of more than one type of communication. In computer science, it is commonly used to mean the mix of sound and sight to deliver a message. In computer-based education, it describes tools which can present sights and sounds capable of representing the real world with considerable realism, safety, and economy (Towne, 1995).

Pedagogical Elements

These are attempts to define segments of educational material. They can divide the material into different lessons, tests, assignments or individual questions. The elements are taken directly from the educator's learning objectives. They are the goals and the reasons for building the simulation, and deciding what to simulate (Aldrich, 2005).

Simulation

A technique used to mimic a social, political, economic, psychological or other process (Cohen, Portney, Rehberger, & Thorsen, 2006). It is a user-centered learning environment where the

user is part of the simulation not the director of it. It allows users to learn by practicing in a repeatable, focused environment. Computers are often used to make simulations more interesting and interactive (Aldrich, 2004; Feng, 2014).

Simulation Elements

Events in the simulation which can be seen or heard such as dots moving across the computer screen or the sound of rain falling are simulation elements. They help the user follow the action in the program. Elements in the program selectively represent objects or situations, and selectively represent user interaction to aid in discovery, experimentation, role-modeling, or practice (Aldrich, 2005; Rodgers, 2015).

Virtual classroom

An online-based educational tool used to bring students together in real time is a virtual classroom. Both instructors and students are able to communicate with all of the members of the class using chat boards, microphones, webcams and speakers. It is an environment which uses the Internet to facilitate live experiences with a teacher and students who are not in the same location in the "real" world (Aldrich, 2005).

VLeader

VLeader is a leadership training program which uses simulation software to allow students to learn and practice leadership skills. It was released in 2002 and honored in 2004 with the award of Best Online Product of the Year by *Training Media Review* and *Training & Development* magazine. Each year the product has been updated; and it is currently available in a downloadable version. The product is a commercially available and used by a variety of corporate and government clients to improve the leadership skills of their employees and managers (Aldrich, 2005).

Researcher's Previous Contact with the Simulearn Software Company

Although the Simulearn Company did not pay the researcher or the institution for the research study contained in this document, for the purposes of full disclosure, the researcher did have previous contact with the Simulearn Company. A faculty member at Indiana University of Pennsylvania was conducting some initial research on Simulearn, however, the project stopped when the faculty member left the University. As Simulearn was still interested in the research, in the summer of 2009, two Indiana University of Pennsylvania graduate students were able to participate in an online training program to become facilitators for the VLeader software at reduced cost. The plan was to explore research options as well as possible uses of the software in future classes. However, due to retirements and other changes in the faculty after that summer, the VLeader project was placed on hold. Several years later, when the researcher chose VLeader as the software to be used in her dissertation study, she contacted the Simulearn Company to purchase the software. Given the prior research association, Simulearn provided this researcher with up to 100 licenses to VLeader for the same price they normally charge for 20 licenses. The researcher and the Simulearn Company were concerned that if students began the training but dropped out, the researcher would run out of licenses before she had enough participants to complete her dissertation and achieve any meaningful results. Allowing the researcher to have a discounted access to the software helped to solve that concern for all involved.

Organization of the Study

The remaining chapters of this dissertation include the following topics: Chapter two is a review of the existing literature concerning the growth of e-learning in higher education, the importance of teaching leadership skills to undergraduates, an overview of constructivist learning theory and an overview of past research studies and the past use of digital simulations in education.

Chapter three is a description of the methodology of the experiment used in this study which compared the leadership aptitude scores of undergraduate students who completed an educational leadership simulation called VLeader with the scores of a control group of students who did not complete the additional training. Chapter four summarizes the findings of the experiment. Chapter five contains a discussion of the relevance of the study and suggestions for future research in the field of leadership training using simulation software.

CHAPTER TWO

REVIEW OF THE EXISTING LITERATURE

The literature available in the fields of education and leadership is extensive. For this analysis, the review of the literature will introduce the topic of leadership and then focus on three specific areas of research within the larger fields of education and leadership. Those areas of interest are: e-learning in higher education, teaching leadership skills, and using simulations in education.

Leadership Overview

From government to business to the family, leadership skills are used daily to help people achieve goals and accomplish day to day tasks. What is leadership? It is a combination of skills that allow an individual to get something done through the efforts of others (Tead, 1935). So, who are great leaders and what makes them great leaders?

Examples of Great Leaders

Who are the great leaders who have influenced our society? Although the lists of "Top Leaders" published by magazines and internet sites change often depending on the day and the fashion of the times, there are some individuals who have possessed leadership skills that have ensured their place in history. Individuals who have attained great power or great wealth are often considered among the great leaders. Winston Churchill (Gilbert, 2011), Abraham Lincoln (Thomas, 2008), and even Adolf Hitler (Waite, 1993) continue to hold a place in history as powerful leaders who led their people during times of great change and danger. Business men and women like Warren Buffett (Schroeder, 2009), Steve Jobs (Deutschman, 2001), and Oprah Winfrey (Peck, 2008) have used their leadership skills to build and run large companies and earn extraordinary wealth. Other leaders like Martin Luther King (Gardner, 2011) and Mother Teresa (Alpion, 2006) have used

their leadership skills to gain social influence to improve conditions for the poor and oppressed people of the world.

Some successful leaders have shared their leadership strategies through books and interviews. Lee Iacocca has written several books and given hundreds of speeches about his experiences at Chrysler where led the company out of bankruptcy and saved the jobs of 600,000 employees (Iacocca, 1989). One message he stresses in his books and speeches is that leaders focus on a positive image of where they want the company to go. They do not try to scare the employees by telling them what could happen if they aren't successful.

Iacocca (2007) says:

A true leader always strives to inspire. That doesn't mean he can't express outrage. But he motivates people to act by appealing to the good in their hearts, not with threats. President Dwight Eisenhower once said, 'You don't lead by hitting people over the head. That's assault, not leadership.' (p. 37)

Carly Fiorina has also shared her advice about leadership based on her experiences as the Chairman and CEO of Hewlett-Packard.

Her advice (2003):

Start with the truth. Once you have the truth, people need inspirational goals. To cross that uncomfortable gap between the truth and the goal, you must set very achievable, step-by-step measures. The process of doing begets progress; along the way, you must remind people of how far they've come already and how much closer they are to achieving the goal. That's when you see the light in their eyes. All these things-honest self-assessment, setting goals, and marching toward them-form a constant process, and t hey are also what makes managing fun. (p. 42)

What Makes a Great Leader?

As an integral skill in our society, leadership has been studied and analyzed by researchers in a variety of fields of study. In the early part of the 20th century, trait leadership or the "Great Man Theory" proposed some people were born with certain traits or abilities that allowed them to be effective leaders (Bishop, 2004). By the 1950s, leadership researchers found evidence leadership skills could be taught and traits were not the only factor in identifying leadership potential (Leonard, 2003). As researchers continued to study leadership, the importance of influence and persuasion skills became a significant focus (Aronson, 2001; Conger, 1998). In the 1960s, situational leadership theory by Blanchard and Hersey was introduced. It said good leaders adopt different leadership styles depending on the situation (Aronson, 2001; Bishop, 2004). Burns (1970) introduced the transactional and transformational leadership theories (Bishop, 2004; Spear, 2009) stated leaders work with subordinates to achieve goals. In the 1980's, charismatic leadership elements were added to Burns' theories and Bass extensively wrote about them making them popular in the academic world. Transformational leaders motivate employees to look beyond their needs and work toward organizational goals (Burns, 2000). Transformational leadership theory is still widely used today to understand how leadership skill can be developed. This leadership research is the foundation used by educators as they attempt to give students every opportunity to develop leadership skills to use after they graduate.

The interest in leadership, by both students and employers, has led to the creation of leadership undergraduate majors at several U.S. colleges and universities. In the past, leadership courses were often included in various majors including business, political science, and liberal arts. Then, between 1993 and 2003, fifteen colleges and universities began offering full leadership

undergraduate degrees (Brungardt, Greenleaf, Brungardt, & Arendorf, 2006). The fifteen institutions are:

Wright State University, Ohio

University of Richmond, Virginia

Rockhurst University, Missouri

Purdue University, Indiana

Penn State University, Pennsylvania

Peace College, North Carolina

Our Lady of the Lake University, Texas

Marietta College, Ohio

Franklin University, Ohio

Fort Hays State University, Kansas

Dominican University, Illinois

Chapman University, California

Carroll College, Wisconsin

Benedictine University, Illinois

Bellevue University, Nebraska

The researchers (Brungardt et al., 2006) documented the growing interest in having a "leadership major" was not specific to any one academic department. They also found more than 1,000 other colleges and universities in the United States had "student leadership programs" within other majors that were growing in popularity and may be on their way to becoming stand alone majors as well.

E-Learning in Higher Education

According to a ten-year study conducted by the Babson Survey Research Group using data collected in partnership with the College Board, the number of college students in the United States taking at least one online course has increased from 570,000 in 2002 to 6.7 million in 2012 (Allen, Seaman, Sloan, Babson Survey Research, & Pearson, 2013). The projections for future growth of online education indicate significant growth in e-learning is expected to continue both in the United States and around the world.

According to the 2012 report from PR Newswire, Asia has the highest growth rate for e-learning on the planet at 17.3%. Revenues for e-learning reached $5.2 billion in 2011 and are projected to more than double to $11.5 billion by 2016 (PR Newswire, 2012, November 5). Other reports also provide information on the growth of e-learning around the globe. The new Ambient Insight report states revenues for e-learning products in the Middle East reached $378.4 million in 2011; and revenues are projected to reach $560.7 million by 2016 (PR, 2012, December 21). E-Learning revenues in Western Europe will reach $8.1 billion by 2016, up from $6.1 billion in 2011 (PR, 2012, September 25). E-learning revenues will nearly double in the Latin America market from $1.16 billion in 2011 to $2.29 billion by 2016 (PR, 2012, August 27).

According to researchers in the Babson study (Allen et al., 2013), in 2012, 69% of chief academic leaders said e-learning was critical to their long-term strategy. This number would indicate e-learning programs will continue to be a valued part of the strategic plan of colleges and universities in the United States. However, the study also documented several concerns about e-learning. In the 2012 data, faculty acceptance of the value and legitimacy of online education had decreased to only 30%. The study found barriers to widespread adoption of online learning exist and include: the need for more discipline on the part of online students (increased from 80% in 2007 to

88% in 2012) and lower retention rates for e-learning students. The proportion of academic leaders who believe a lack of acceptance of online degrees by potential employers is a barrier remained constant at just over 40 percent. And finally, the study found the percent of academic leaders who believe it takes more faculty time and effort to teach online has increased from 41% in 2006 to 44% in 2012.

The 2012 study did find that there have been some improvements in the perception of the relative quality of online instruction as compared to face-to-face instruction. In the first report of this study, in 2003, 57% of academic leaders rated the learning outcomes in online education as the same or superior to those in face-to-face instruction. That number increased to 77% in the 2012 report (Allen et. al., 2013).

The growth of e-learning technologies has made distance education classes a popular option for students in higher education (Forsyth, Pizzica, Laxton, & Mahony, 2010). This has improved access to education in rural areas where travel to classes represented a significant loss of time, money, and productivity (Pittinsky, 2005). E-learning has also improved the loss of community with their peers that commuter students often experienced in the traditional classroom when the class ended (Pittinsky, 2005). Now thanks to virtual classrooms and avatars, interaction, both planned and incidental, can help students learn together and keep in touch even after the class has ended (Kim, 2008; Park, Jung, & Chris, 2008). This incidental learning from each other is also useful as a replacement to the incidental learning, which occurs in the classroom, in traditional educational settings. By using technology, educational opportunities can be brought to many individuals unconstrained by geography, schedules, or instructor availability (Towne, 1995).

Teaching Leadership Skills

In his article, Greenwald (2010) described the increased focus on leadership in higher education. Greenwald, (2010) wrote, "It seems that every university web page and presidential message now highlights leadership opportunities for students at both the undergraduate and graduate levels" (p. A80). It doesn't take much investigation to see what Greenwald said is true. References to leadership can be found on university web pages from Penn State University to Harvard College. The Penn State university website states: WHAT WE DO BEST - We teach students to be "**leaders** with a global perspective" (Penn State University, 2015). Yale University's website posts their mission statement. It includes "Yale seeks to attract a diverse group of exceptionally talented men and women from across the nation and around the world and to educate them for **leadership** in scholarship, the professions, and society" (Yale University, 2015). Harvard College's website quotes their mission: "The mission of Harvard College is to educate the citizens and citizen-**leaders** for our society" (Harvard College, 2015).

Today's students recognize leadership skills are going to be necessary for their careers (Greenwald, 2010). In the past, college graduates could rely on management training programs and corporate training sessions to help complete their leadership education. However, those options have been severely reduced in today's leaner business world. As future leaders, graduates of higher education institutions are supposed to deal with complex problems in constantly changing environments. In this respect, teaching leadership skills through university programs and finding methods leading to the acquisition of leadership skills in higher education are essential concerns of today's educators (Thompson, 2006).

Mission statements of universities often point out their commitment to the development of students as future leaders and the importance of curricular and extra-curricular activities leading to

students' leadership development (Astin & Astin, 2000; Dugan, 2006a; Dugan, 2006b). However, how does this change when more and more students are choosing e-learning options instead of the traditional classroom experience? In the past, formal leadership education, when offered, was classroom-based. This allowed students to be introduced to leadership theories and case-studies. Over the years, researchers in management studies have determined new managers in leadership roles learn how to be leaders by wrestling with real world problems and consequences and they quickly find out reality is quite different than theory (Hill, 2004; McCall, 1998; Mintzberg, 2004). Experience has long been regarded as important in the development of leadership skills (Datar et al., 2010; Zemke & Zemke, 2001). The challenge for the educator is not to teach leadership, but rather to create possibilities for learning, experiencing, and building leadership skills through a process resembling Kolb's (1984) learning cycle (Seger & Bergsten, 2013). Unfortunately, the majority of higher education curricula lack a focus on building leadership skills and has been criticized for failing to prepare students for leadership positions (Pfeffer& Fong, 2002).

Higher education graduates not only need to have a broad perspective of the issues concerning their profession, but they also need to have leadership skills to be able to act in managerial positions effectively (Mustafa, 2013). Much has been written about leadership and how it should be learned. The activity of influencing people to cooperate toward some desirable goal is the single most important function of a leader (Tead, 1935). However, Leadership is not a simple concept. Leadership is multifaceted, simultaneously requiring an effective leader to be both directive and structure focused (transactional) and inspirational and visionary (transformational) (Hernez-Broome & Hughes, 2004). House (1996) focused upon leader effectiveness in terms of leaders' relationship with subordinates in providing support and motivation to accomplish organizational goals. Positive Leaders enable extraordinary performance by fostering a positive work

climate (Cameron, 2008). “Leadership is that combination of qualities by the possession of which one is able to get something done by others, chiefly because through his influence they become willing to do it” (Tead, 1927, p. 394). All of these leadership training approaches take time to master. And most of them are concepts that do not prepare the student for the real world. By some estimates over 80% of leadership development is ultimately learned on the job through experience and practice (Zemke & Zemke, 2001). Perhaps this is why researchers have looked to educational simulations to teach leadership skills (Avolio, Waldman & Einstein, 1988; Putman, 2012; Sidor, 2007).

Clark Aldrich (2004) describes how his company created the Leadership Simulation Virtual Leader. His goal was to create an educational simulation that allowed users to see how applying leadership principals worked in the real world. He describes his software in the book by saying that it was able to replicate the subtleties of a leadership situation. Each move and everything the player did had multiple effects in the simulation. Some the player intentionally caused and some he or she might not have wanted” (Aldrich, 2004). This type of simulation is useful in leadership training because it allows the student to practice leadership skills and see the consequences of actions in a world that is complex and dynamic similar to the real world.

Using Simulations in Education

Using simulations in education is not a new concept. Thiagarajan and Stolovitch (1979) explained several paper and pencil simulations that teachers could use in the classroom to help teach difficult concepts such as conflict resolution and collaboration. The authors stated their opinion that simulations were the most effective instructive design format to help students achieve attitudinal learning objectives. As technology has advanced, simulations have borrowed from the computer game technology to become more realistic and more fun. This has increased the debate among

researchers as to the actual effectiveness of digital simulations in education. Some researchers believe digital simulations will become more widely used as a tool in education. Other researchers believe digital simulations are just games that distract students from the real work of learning. In order to review the literature on the use of simulations in education, it is necessary to break the topic into three sections: Constructivists and Learning, Simulations in Theory, and Simulations in History.

Constructivists and Learning

The process of using a digital simulation has similarities to the learning processes outlined in constructivist theory (Begg, Dewhurst, & Macleod, 2005). Constructivism is related to simulations because simulation games can create a context in which the user must make a variety of decisions while playing (Warren, 2001). This goes back to John Dewey's "learning-by-doing," that he saw primarily in the master-apprentice relationship. Simulations let players explore environments, solve problems, get immediate feedback, and try again immediately (Squire, 2005; Williams-Bell, Kapralos, Hogue, Murphy, & Weckman, 2015). The use of simulations in education is consistent with a constructivist viewpoint that argues learning is constructed as the learner develops his/her understanding through experience and reflection (Kiggins, 2005).

Constructivists such as Piaget (1997), Kolb (1984), and Vygotsky (1986) wrote about the importance of experience in learning. Piaget's theory of cognitive development focuses on the development of human intelligence and the importance of experience in the learning process. Kolb published his learning styles model in 1984. From there, he developed his learning style inventory. Kolb (1984) said, "Learning is the process whereby knowledge is created through the transformation of experience" (p. 38). According to Kolb (1984), experiential learning consists of four elements: concrete experience, observation and reflection, the formation of abstract concepts, and testing in

new situations. Vygotsky's (1986) concept of the zone of proximal development attempts to explain how new knowledge is dependent on previous learning or experience.

Merrill wrote, "Appropriate practice is the single most neglected aspect of effective instruction" (Merrill, 2001, p. 464). Many researchers have also found practice or experience is an effective tool to promote learning and development (Beard & Wilson, 2006; Ng et al., 2009). According to Rogers (1969), learning is improved when the learner has control over the nature and direction of the learning. Humans learn when they think through experiences they have had (Gee, 2003). All of the above researchers have come to the same conclusion, that experience improves learning.

Video games and simulations enhance learning in other ways traditional learning methods cannot, or do not currently, do. They can provide just-in-time or on-demand learning (Gee, 2005). In this construct, constructivism and situated learning merge, as the learner is able to obtain information near the time he/she is going to be able to see how it works in the world, so that the learner has some experience to connect to give the information real meaning. This type of learning is completely opposite of the decontextualized learning of individual facts which is derived from reading" (Gee, 2005). McLuhan (1964) seemed to support Gee's opinion about the value of games in education when he wrote that anyone who made a distinction between games and learning didn't know the first thing about either one.

Simulations in Theory

With the advance of technology, the body of literature in the field of study of digital games and simulations has grown. Gee (2005) describes how many types of visual images and symbols in video games and other types of computer-based learning simulations can be more effective to today's students than traditional methods of education. Boelstroff's work focuses on the future of

education and how it will evolve into the expanded use of games, simulations, and virtual worlds to teach a variety of skills (Boelstroff, 2010). Au was the first writer to cover the world of Second Life from the inside. His book, (Au, 2008) follows the growth of virtual worlds and explores the benefits of learning in virtual or simulated environments. Aldrich (2004) provides insights into his view of the increasing use of simulations in all types of education and training including leadership training using the VLeader simulation software.

Two of the biggest reasons for the growing interest in using simulations in education today is that computing power has reached a point where it is cost-effective (Barnett 2000; Cohen, et al., 2006; Feng, 2014; Hovenga & Bricknell, 2004; Marharg, 2006; Shaffer, 2004) and the fact that the gaming generation has come of age (Aldrich, 2004; Prensky, 2001). Today's university undergraduate students have grown up with computer technology and use it daily for a variety of activities from correspondence to entertainment. Simulations are powerful tools that give power to the students learners (Jones, 1997). When today's students enter a classroom, they expect to find technology used there as an educational tool to keep them interested and to help them accomplish learning objectives (Linser & Ip, 2000; National Research Council, 2011; Towne, 1995).

In a 2005 interview with Clark Aldrich, Jane Boston, described four ways to best use simulations for educational purposes. Her list included: to develop an understanding of big ideas and concepts that can only be understood through experience, to deal with time and scale for actions, which might actually take several lifetimes to play out, to give people practice in decision making before they are faced with a dangerous or critical, real-life situations and to take the learner to a time or place that he/she would be unable or unlikely to experience directly. (Aldrich, 2005; Gheorghiu, 2014; Williams-Bell et al., 2015). This idea of using educational simulations when the real world environment is unavailable was also discussed by Towne (1995) when he wrote that software

simulations are useful when the training environment in the real world is unavailable for training purposes or dangerous such as a satellite in orbit or the inside of a nuclear reactor. Other researchers have also pointed out the value of the simulation in providing a danger-free learning environment (Cohen, et al., 2006; Gibson & Baek, 2009). Farina's (2008) research also detailed positive faculty perceptions of simulations as non-threatening environments that provides safe practice for students without the potential to harm themselves or others.

Educational simulations happen at the convergence of three elements: simulation elements, game elements, and pedagogical elements (Aldrich, 2005). There are several benefits to using educational simulations. Educational simulations help different students communicate and learn in different ways (Gee, 2007). Educational simulations allow the learner to "learn by doing" (Kluge, 2007; Prensky, 2001). The possibility of immediately exploring different scenarios makes educational simulations more engaging than textbooks or lectures, and creates excitement about learning (Squire, 2006). Educational simulations help players apply abstract knowledge to the real environment (Kiggins, 2005). Research suggests learning transfer is more effective when the learning environment resembles the real world such as in educational simulations (Cohen, et al., 2006; Ng & Cervero, 2005; Ormrod, 2004). It is the exploratory or discovery aspect of educational simulations that provides their greatest learning potential. Simulations encourage learners to explore (play), which encourages them to interact with the simulation, and spend more time "learning" (Choi & Johndon, 2005; De Freitas, 2006; Franklin, 2008).

Although simulations have become popular education tools, experts agree digital simulations should not be used in every situation just because it is possible to use them. Some classes work better in simulations than others based on the students and the topics being taught (Laster, 2009).

Digital simulations, like all educational technology should only be used when it makes sense to spend the time and money to use them (Cohen, et al., 2006).

Negative Views of Using Simulations in Education

There are researchers who have concerns about the use of simulations in education. In the past, digital simulations often promised more than they could ever deliver (Cohen, et al., 2006). This has produced a group of students and professors who are disillusioned with educational simulations and choose not to use them. Some educational simulations are not able to simulate real life. Weapon simulations look at a destroyed world that, thankfully, does not exist. Mars landing simulators estimate a world that researchers cannot completely describe yet. It is not helpful to allow students to believe simulators always show "real" environments when real life may, in fact, be much different than the world shown in the simulation (Gredler, 2004). Other researchers point to the overwhelming amount of detail in some simulations that attempt to replicate too much of the real world. This can overload and unbalance the simulation making it distracting and ruining the educational effectiveness of the simulation (Jones, 1997).

Simulations often require prior knowledge to understand and run the simulation. Effective learning using simulations requires a facilitator to answer questions and monitor progress. Some researchers feel this adds additional work for the instructor to learn the simulation and takes additional time to serve as a facilitator while the students are in the simulation (Towne, 1995). Other educators think games and simulations are entertainment activities enjoyed by children. They perceive these types of activities as competition for education not as tools for education (Cohen, et al., 2006, Jones, 1997; National Research Council, 2011).

With the growth of technology, computer games, and the Internet, many experts projected educational simulations would become standard tools in all educational situations in a very short

period of time. According to Clark Aldrich (2005), many of these expectations are exaggerated from any practical view of the usefulness of digital simulations in education. Aldrich compares the exaggerated expectations to the claims on advertisements made when microwave ovens first became available. Projections of microwaves completely replacing traditional stoves and ovens turned out to be exaggerated promises considering the actual strengths and weaknesses of the new technology. Aldrich believes the availability of educational simulations will continue to grow until the technology is commonplace, less expensive, and easier to produce. However, he does not expect educational simulations to replace all traditional methods of teaching. In his view and in the view of other researchers as well, educational simulations in the future will be just another tool in the educator/trainer's toolbox (Aldrich, 2005, Towne, 1995).

One of the major impediments to using educational simulations in education and training today is the lack of efficient and effective tools to create these technologies. The production of educational simulations is expensive in terms of both time and money (Towne, 1995). Currently, there is a lack of quality simulation tools for educators. Although this issue has decreased over time, Thorsen (Cohen, et al., 2006) points out new simulation authoring environments need to be developed to allow subject matter experts and pedagogical experts to write their own simulations (Gibson & Baek, 2009).

Simulations in History

Education and management faculty often see simulations as being distinct from digital games (Becker & Parker, 2006; Gredler, 2004); however, with the advance of technology, many researchers and educators are adding digital game elements to simulations to make them more fun and to make them appeal to the digital native students (Prensky, 2001) who have grown up with technology and expect to see game and entertainment elements in all types of digital content – including educational

content. Educators in the fields of nursing and military sciences have been using digital simulations for decades with great success (Gredler, 2004).

Nursing

There has been a long history of using simulations in the fields of nursing and medical training. Simulations allow students to experience the stress and emotion of life and death situations while in the classroom. Cavalier from Carnegie Mellon University (Cohen, et al., 2006) studied the use of one of the first multimedia simulations developed to teach medical ethics. It was based on a famous medical case - the Dax Cowart Case. In this example, students watch a video of a burn victim who requires painful treatment to recover from severe burns over most of his body. The treatment will continue for 270 days to save the patient's life. The patient cannot take the pain and wants the treatments to stop. He asks to be allowed to die. In the simulation, students watch interviews with the patient, the doctors, and the family. Then, the student must make a decision and justify his/her answer using medical ethics.

The most visible use of simulation training in nursing is the use of task trainers. These training devices came into use in the 1960s with the invention of Resusci Anne. This was a cardio-pulmonary resuscitation mannequin developed by Dr. Asmund S. Laerdal. It allowed students to see and feel a realistic simulation of a human body while practicing resuscitation techniques (Laerdal, 2007). A few decades later, technology had advanced to the point where in the 1990s, simulation mannequins were being used in nursing classes (Nagle et al., 2009). Simulation mannequins could breathe, talk, and mimic patients in a variety of ways; and they became the newest educational simulation tool used in nursing education. Today, nursing programs use both simulated clinical training using simulation tools and real-world clinical training in hospitals to train their nursing students. According to a 2012 study, the average Pennsylvania Practical Nursing Program replaces

14.97% of their traditional clinical learning time with simulated clinical experience (Cornelius, 2012).

Military

The military has been the most consistent consumer of simulation training throughout history. There is evidence of a barrel with wooden sticks being used by swordsmen as a battle simulation to teach battle tactics dating back to 1000 B.C. (Harris, 2009). Throughout the years, the military continued to simulate battle to train soldiers. And in the early 20th century, paper simulations were used to train officers on tactics and strategy. As technology advanced, the military embraced game-based simulations and in many ways remains at the forefront of the use of digital simulations for training and education today (Laff, 2007).

The United States military is often called the greatest training organization in the world (Aldrich, 2005). This distinction is most likely due to their willingness to use every effective teaching tool possible to train their troops. The most commonly used example of this is their extremely successful use of flight simulators to train pilots (Ennis, 1981; Gheorghiu, 2014; Jones, 1997). The first flight simulator was patented in 1910 (Aldrich, 2005). The first flight simulator was introduced in 1929 to train marine and aviation pilots and was used during World War II, to instruct approximately 500,000 military pilots (Ennis, 1981). In both WWII and the conflict in Korea, the more experience a pilot had using the flight simulator, the less chance he had of being shot down. Experience helped the pilots learn everything they needed to know (Gheorghiu, 2014).

Flight simulators became a popular and highly visible example of the effective use of simulations in education. Students learned by doing. The flight simulator made the case for using simulations in education effortlessly by allowing pilots to crash a hundred times in the simulator in order to help them avoid crashing even once in real life. In 1972, the first flight simulators to use

computer-rendered scenes were built by General Electric for the U.S. Navy (Aldrich, 2005) and opened the door to the use of digital simulations in other types of education.

The U.S. military uses training simulations to accomplish other goals as well. In July of 2002, a free, first-person shooter game called "America's Army" was released by the United States Army as both a recruiting game and a high-level training simulation (Aldrich, 2005; Stitt & Chappell, 2005). This was a direct attempt to get the attention of a generation, which grew up with computer games, and it worked becoming a valuable recruitment tool as well as a training program. The U.S. military also uses simulation training for non-combat education. The Department of Defense uses a simulation game to build team-working skills among its employees (Laff, 2007).

The flight simulator is not the only simulation tool used by the U.S. Military for combat training purposes. Any military instructor in charge of preparing soldiers for combat looks for simulations to give soldiers practice in the environment they will be entering (Aldrich, 2004). These training simulators allow soldiers to fail with limited consequences. If a soldier dies in a simulation, it helps them develop skills to survive on the real battlefield (Schollmeyer, 2006). Aldrich (2004) quotes Lieutenant General Eugene D. Santarelli, Vice Commander, Pacific Air Forces, USAF, Air Component Support to Joint Exercises, when he writes that computer simulations have become a must in military training. Unlike the scripted, paper-driven exercises of the past, computer simulation may be the only way to represent the complexities of future warfare.

With a long, successful history of using simulations in other fields, the digital simulation technology is now being used to accomplish a variety of other educational goals. What methods will be used in the future to ensure undergraduate students are improving their leadership skills? Could the use of a leadership training simulation software allow students to improve their leadership skills

from any location where they can run a leadership training simulation program? Research studies such as this one, which was designed to find and test educational tools to help create effective learning environments when students and professors are not in the same location, will help improve the higher education experience for all undergraduate students in the future.

CHAPTER THREE

METHODOLOGY

Introduction

This leadership training study was completed using an experiment designed to test the effectiveness of an educational leadership simulation program called VLeader. The study compared pre and post-test scores of participants in a control group with those of participants in an experimental group who received the VLeader treatment. The following chapter provides details of the methods used to conduct this experiment.

Experimental Design

The experiment in this study was a quasi-experimental study that used a single experimental group of 32 participants and a single control group of 36 participants. Both groups completed a leadership aptitude test (pre-test) and then repeated the test a month later (post-test). The experimental group participants also received a treatment of taking leadership training using the educational simulation software called VLeader during the month between the pre-test and the post-test.

The study was conducted during the fall semester of 2014 and the spring semester of 2015 at Indiana University of Pennsylvania. Faculty teaching junior and senior level Communications Media students were asked to add this study to their list of extra credit options for their undergraduate students. The goal was to include 60 participants in this study with at least 30 in the experimental group and 30 in the control group. When the study was closed, 32 students successfully completed the study in the experimental group and 36 in the control group for a total of 68 students in the study.

The researcher visited two classrooms in the fall 2014 semester. The classes were: Comm 395 - "Career Planning in Communications Media" and Comm 303 - "Scriptwriting." The researcher visited three classrooms in the spring of 2015. Those classes were: Comm 303 - "Scriptwriting" (two sections) and Comm 403 - "Broadcast Newswriting." During the classroom visits, the researcher introduced herself and read the invitation to participate in the study (See appendix A.) A copy of the invitation to participate in the study was distributed to each student. Students expressing interest in participating were given a copy of the informed consent form (See appendix B.) When the informed consent form was signed and returned, the student received the instructions for logging into the first survey. Volunteers participated in the study on their own computers on their own time. They followed a link to Qualtrics and completed the pre-test, a Leadership Aptitude Test (See appendix F.) This leadership test was taken (with permission see appendix C) from the Leadership Assessment Tool Inventory section of the textbook Developing *Management Skills* (Whetton, D. & Cameron, K., 1995). During the study, all participants were able to contact the researcher by phone or email. Five participants contacted the researcher through email with technical questions about getting their computer, tablets and phones to run the software. Fortunately, since the researcher had paid the Simulearn Company for the licenses to run the software for this study, the researcher and all participants were able to use the services of the Simulearn Technical Support Line to help them install and run the software. The researcher emailed all study participants a month after they took their first Leadership Aptitude Test to remind them it was time to take the second test. The final contact with participants was an email after they finished the second Leadership Aptitude Test thanking them for their participation in the study and informing them that they had completed the study and earned the extra credit in their Communications Class (See appendix E.)

Given the time required to complete the VLeader training, students were asked to volunteer to take the training at the end of the first survey. Those students volunteering to take the training were given the link to download the VLeader software and were assigned to the experimental group. Students who did not volunteer to complete the training were assigned to the control group. While this volunteer assignment to the experimental group might have added some degree of bias based on willingness of the participants to take the additional training, a statistical comparison of the leadership aptitude scores of the students in the two groups (see chapter 4) showed there was no statistically significant difference in leadership aptitude scores between the two groups at the beginning of the study.

A month after the first leadership aptitude test, all participants (in both control and experimental groups) received an e-mail reminding them it was time to complete the post test. Only participants completing both the pretest and post test were included in the study results. (Eight incomplete surveys were located and deleted. Three of those came from the control group and five from the experimental group.) Once the post-test was completed, participants received a thank you e-mail (See Appendix E) they could print and turn in to their professor to receive extra credit in their Communications Media class.

Each member of the experimental group was given a link to download and install the VLeader software on his or her own computer. In the month between the pre-test and post-test, experimental group participants completed the training using the simulator. In addition to the extra credit all the students received for volunteering to participate in the study, experimental group participants completing 12 hours of training on the VLeader software received a certificate from the Simulearn Company, owner of the VLeader software, stating the participant had

completed a leadership training program. The students could then list the certification on their resumes.

Sample Selection

This study employed the convenience sampling method of selecting participants. The researcher approached junior and senior undergraduate students in the Communications Media program at Indiana University of Pennsylvania and asked for volunteers to participate in a study about leadership. As Reinard (2006) states, researchers may use this approach to select participants without a lack of "research rigor" when sample bias is not a "substantial issue." In this study, the researcher is attempting to predict the effects of the simulation on motivated students who choose to take an e-learning class. As the focus of the study was on leadership training, the aim was to recruit volunteers willing to complete a leadership training program on a leadership simulation software. The researcher believed interested students would be more appropriate subjects as the study required the willingness to complete educational training online.

Statistical Analysis

In Chapter Four, the hypotheses were tested and the research questions were answered. (All of the research questions and hypotheses are listed in Chapter One and Chapter Four.)
The statistics used in Chapter Four are described below. The first research question focused on the differences between the control and experimental groups and the pre-test scores and the post-test scores. A Levene's test was used to check for homogeneity of variances before each t-test and ANOVA in this study, none of the Levene's test results were significant so no adjustments were needed in any of the statistical tests. H1.1 compared the pre-test scores of the control and experimental groups using an independent samples t-test with the dependent variable pre-test scores. H1.2 and H1.3 compared pre to post-test scores for the control group and the experimental group. In

both cases, a paired t-test was used to analyze the scores for the same group at two different time periods. Hypothesis H2.1 through H2.4 under the second research question, looked at the change in scores from pre to post-test for different demographic segments of the experimental group. ANOVA was used instead of t-tests so that demographic groups with more than 2 segments such as age and GPA could be analyzed. For H3.1 under the third research question, the amount of change for extra effort and minimum effort given to the training was compared using an independent sample t-test with the change in score from pre to post-test as the dependent variable.

VLeader Educational Leadership Simulation Program

SimuLearn's Virtual Leader is an educational leadership simulation software released in 2002 and honored in 2004 with the award of Best Online Product of the Year by Training Media Review and Training & Development magazine (Aldrich, 2005). Each year the product has been updated; and it is currently available in a downloadable version called VLeader. The VLeader product is a commercially available product that has been used by a variety of corporate and government clients to teach and practice leadership skills. Below is a brief description of the VLeader simulation software and how the students move through the training.

In the VLeader Training Program, the user is introduced to a character named Oli. The goal of the first level of the training is for the user to have a meeting with Oli and convince him to make certain projects a priority in his workday. The user has various strategies to encourage Oli to do what the user wants him to do. The user can draw positive attention to the project. The user can draw negative attention to other projects that are a lower priority. The user can give Oli himself positive attention. The user can be stern with Oli. By using a mixture of several strategies, the user completes the meeting with Oli. After the meeting, the user receives a critique of his or her performance including how many of the important projects they were able to get Oli to agree to

complete. The simulation is very simple to learn. However, it quickly becomes obvious that getting Oli to do what the user wants him to do can be very complicated. Oli is sometimes in a good mood and sometimes in a bad mood. Oli gets hungry and bored. Oli has other projects he feels are more important than the user's projects. In addition, each time the user starts a meeting with Oli, all the variables change. Therefore, Oli's mood and priorities change each time the user completes level one. The user has unlimited time to practice this level. Then the user has three "official" attempts to complete the level. The highest score of the three "official" attempts is the one that is saved as the final score for the level.

There are five levels to the VLeader training. With each level, more people enter the meeting. Level two has two people in the meeting with the user. Level three has three people in the meeting with the user. As the levels and meeting sizes go up, the user learns how additional people entering a meeting can add more issues. For example, the people begin to agree or disagree among themselves. In some cases, the user must take back control of the meeting without insulting anyone in the room.

At the highest level, the meeting is about a corporate crisis that has just occurred. The user must find people and strategies to deal with the employees, the press, and the customers. Moreover, at this level of the game, everyone in the room has different ideas about what should be done. The user must decide what to do and get the rest of the people in the room to agree.

The VLeader training comes with a workbook and various hint screens inside the simulation to help the user learn how to successfully complete each level. As the user learns how to "play the game" they are actually learning leadership skills that can be used in the "real world." This study attempts to determine if participants who completed the VLeader training scored better on a "real world" leadership aptitude test than students who did not receive this training.

According the Simulearn company's description of the VLeader simulation, it is designed to teach participants to be aware of leadership power, tension and ideas and to use them to create business results that are measured by customer satisfaction, employee morale, and financial performance. In addition, participants learn about their own leadership style and how it is passive/delegating, active/participative, and dominating/directive (Aldrich, 2005).

In a 2005 study, a Fortune 100 company used Virtual Leader and was able to improve their teams' relative performance rankings an average of 22% (Aldrich, 2005). Sidor (2007) used the VLeader simulator in his study at the University of Central Florida to measure the impact of computer-based simulation training on leadership development. He found participants in his study demonstrated statistically significant gains in their emotional intelligence scores after using VLeader (Sidor, 2007). These studies showed VLeader was able to improve participant's scores on various leadership-related measurements.

The researcher conducting this study had experience using the VLeader software and had been trained as a facilitator for this software while working as a graduate assistant. However, other leadership training software was considered for use in this study. Competitors with the VLeader Training Software include the Harvard Business Publishing's Leadership and Team Simulation called "Everest V2" (Nichols & Wright, 2015), Capsim's Training (which focuses on financial decision-making), BTS (board games), and the lecture and workbook leadership training offered by companies such as Covey, Blanchard, and Skillsoft. While all of these products could have been used in this study, VLeader was chosen for several reasons. Most importantly for this study, VLeader is available as a computer software download over the Internet instead of a paper-based instruction workbook or board game. The process of obtaining and using the simulation training utilizes the same type of equipment and computer skills needed to take an e-learning undergraduate

class online. Also important was the fact that the simulation used to deliver the training is office-based and puts the participants in "a meeting" situation. The VLeader training is better targeted to the types of leadership situations communications students would expect to encounter after graduation. For these reasons, and since there is no existing data available on how scores on leadership aptitude scores are affected by using the VLeader simulation, VLeader was selected as the leadership education simulation software to be used in this study.

The Leadership Aptitude Test

The purpose of this research was to look for ways to improve scores on leadership aptitude tests. In the past, companies would train promising entry level employees by moving them into internal leadership training programs. Over time, those programs have become less common due to financial cutbacks in training budgets. Instead, job applicants are routinely given one of many commercially available leadership aptitude tests designed to measure a job candidates leadership skills

Management and leadership researchers Whetten and Cameron at Brigham Young University created a textbook that was originally published in 1984; and it has been so successful it has been updated eight times. The most recent, 8th edition, was published in 2011 (Whetten & Cameron, 2011). This textbook was designed to help future business leaders improve their leadership skills. According to Whetten and Cameron, the most effective way they found to improve leadership skills in students is based on social learning theory (Bandura, 1977; Davis & Luthans, 1980). For this reason, their approach includes opportunities to practice and apply observable behaviors. Whetten and Cameron believe students must be made aware of their current level of leadership skill competency and be motivated to improve (Whetten & Cameron, 1998). Their leadership aptitude test (a compilation of several smaller self-assessments found throughout their text book) is designed

to allow students to see their leadership skill set and work to improve those areas that need further practice. After selecting this instrument, the researcher contacted both authors and the publisher of the text book requesting permission to use the assessment. Permission was granted and can be found in Appendix C. A copy of the leadership aptitude test can be found in Appendix F. The Whetten Cameron leadership aptitude test was used as both the pre and post leadership aptitude test in this study.

In the next chapter, Chapter Four, the findings of this experiment are summarized. Descriptive stats, t-tests and ANOVA comparisons are used to answer the research questions including the primary research question: Did the VLeader training improve leadership aptitude scores?

CHAPTER FOUR

DATA AND FINDINGS

This chapter summarizes and explores the data and statistical tests from the leadership training study using the VLeader simulation software with undergraduate students at Indiana University of Pennsylvania. The statistical tests used to analyze the data and answer the research questions in this study included descriptive statistics, t-tests, and ANOVA tests. This chapter includes an overview of the experiment and the participants, as well as, an examination of each research question and its hypotheses.

The Experiment

The experiment for this study was conducted during the fall 2014 and spring 2015 semesters at Indiana University of Pennsylvania. Undergraduate students in the Communications Media Department were invited to volunteer for this study as one of the options available to them to earn extra credit in their Communications classes. In planning the study, the target was to have at least 60 students complete the study with a minimum of 30 participants in the control group and 30 in the experimental group. At the end of the first phase of the study, which ran from October 15, 2014 through the end of December 2014, 19 students had completed the study in the control group; and 13 students had completed the study in the experimental group. The study was temporarily closed while classes were on break between semesters. The study was re-opened on February 15, 2015. By the beginning of April 2015, the study had passed the 30 student mark in both the control and experimental groups. At that time, all students in the process of completing the study were notified via email that they had until the end of the month to complete the study. (This allowed students to complete the study to earn their extra credit and complete the training to earn the leadership training certificate from the company.) The study was officially closed at the end of April 2015. At that

time, 32 participants had completed both leadership aptitude tests and the VLeader training in the experimental group and 36 students had completed both leadership aptitude tests in the control group for a total of 68 students successfully completing in the study.

Data

After the data collection portion of the study was completed, the results of the surveys in Qualtrics were downloaded to the IBM SPSS software. Of the 76 students who started the study, there were three students in the control group and five in the experimental group who did not complete the study. These individuals were excluded from the analyses. See Table 1 for a summary of these steps.

Table 1

Total Number of Survey Participants

Group	Attempted	Incomplete Data	Total
Control	39	3	36
Experimental	37	5	32
Total	76	8	68

Demographic Profile of All Participants

A descriptive analysis was conducted of the demographic traits of the study participants. Table 2 summarizes the demographic traits of the 68 undergraduate students. The results are listed by group (control and experimental) and by total. The study participants can be described as follows: There were 25 males in the study and 43 females. The age of the participants ranged from

19 to 26 years with an average age of 21. Sixty of the participants were Communications Media majors and eight were taking a Communications Media class as an elective. Twenty-nine of the students were juniors and 39 were seniors. Grade point average was divided into four groups between 2.0 and 4.0 with seven participants in the 2.0-2.49 group, 22 in the 2.5-2.99 group, 18 in the 3.0-3.49 group, and 21 in the 3.5-4.0 group. Ten students listed their race as African American, 54 as Caucasian and three as "other." Sixty-five of the participants listed their home state as Pennsylvania. See Table 2 for a summary of this data which describes the study participants.

Table 2

Descriptive Statistics of Demographic Traits

Trait	Control	Experimental	N (Total = 68)
Gender: Female	26	17	43
Gender: Male	10	15	25
Age: 19	1	2	3
Age: 20	9	9	18
Age: 21	18	13	31
Age: 22	5	5	10
Age: 23	2	2	4
Age: 24	0	1	1
Age: 25	0	0	0
Age: 26	1	0	1
Major: Communications	34	26	60
Major: Other	2	6	8
Class Rank: Junior	13	16	29
Class Rank: Senior	23	16	39
GPA: 2.0 – 2.49	3	4	7
GPA: 2.5 – 2.99	10	12	22
GPA: 3.0 – 3.49	12	6	18
GPA: 3.5 – 4.0	11	10	21
Race: Caucasian	26	28	54
Race: African American	6	4	10
Race: Other	4	0	4
Home State: PA	33	32	65
Home State: Other	3	0	3

Leadership Aptitude Scores

At this point, the leadership aptitude scores were calculated for each survey. This scoring procedure was included with the leadership aptitude test taken from "Developing Management Skills" (Whetten & Cameron, 1998). Possible scores for the leadership aptitude test range from a low of 0 to a high of 679. Table 3 summarizes the descriptive statistics from the four sets of test results.

Table 3

Pre-Test and Post-Test Scores by Group

Group	Test Scores	N	Mean	Std Dev	Minimum Score	Maximum Score	Range of Scores
Control	Pre	36	272	47	154	368	214
Control	Post	36	276	46	169	373	204
Experimental	Pre	32	269	46	134	328	194
Experimental	Post	32	284	41	188	379	191

Total Test Score Range Possible = 0 - 679

In Table 3, the results of the leadership aptitude test scores are listed. The pre-test scores, of all participants, ranged from a low score of 134 to a high score of 368. The post-test scores, ranged from 169 to 379. Looking at the control group, the pre-test leadership aptitude scores ranged from a low score of 154 to a high score of 368 with an average score of 272. The post-test scores ranged from 169 to 373 with a mean score of 276. In the experimental group, the pre-test scores ranged from a low score of 134 to a high score of 328 with an average score of 269. The experimental

group's post-test leadership aptitude scores ranged from 188 to 379 with a mean score of 284. As the descriptive statistics show, the test scores were consistent across all of the groups which indicated that using volunteers for the experimental group did not create vastly different samples for the control and experimental groups. This possible difference between the samples was tested using an independent samples t-test between the pre-test scores of the control and experimental groups and is described and summarized later in this chapter in the section testing the H1.1 hypothesis.

VLeader and Leadership Aptitude Scores

RQ1: Does completing the leadership simulation training program VLeader improve the leadership aptitude scores of undergraduate college students?

To determine if the treatment affected the post-test scores in the experimental group, it was first necessary to make sure that the leadership ability of the students in the control group was similar to the leadership ability of the students in the experimental group before the treatement was applied. Given the time commitment required of participants in the experimental group (12 hours of student time on the simulator) and cost and time constraints for using the simulation, students were asked to volunteer for the experimental group. As a result, it was possible that the students who volunteered to take the training might be more motivated or have a greater interest or ability in leadership. To check for this possibility, the first hypothesis looked for any differences in the two groups before the treatment. Since the researcher did not expect to find any differences, the first hypothesis stated that there would be no difference found between the control and experimental groups' pre-test scores. While this may not gauge motivational level, it does help to verify that on initial leadership abilities, the two groups were comparable.

H1.1: There is no significant difference between the pre-test scores of the experimental group and the pre-test scores of the control group.

To test H1.1, an individual sample t-test was used to compare the mean pre-test scores between the control group and the experimental group to make sure that the two samples were not significantly different from one another before the treatment was applied to the experimental group. The result of that t-test is summarized in Table 4.

Table 4

Independent Samples t-test on the Pre-test Scores of the Control and Experimental Groups

	T	df	Mean Difference	Std Error Difference	Significance (2-tailed)
Pre-test scores	.329	66	3.712	11.293	.743

Levene's = .115 (df = 66, 65.543) p = .736

In this test, the significance value for Levene's Test is larger than .05, so equal variances are assumed. As seen in Table 4, there is no significant difference in the pre-test leadership scores of the control and experimental groups ($t(66) = 0.329$, $p = .743$). Table 3 shows that the leadership scores on the pre-test for the control ($M = 272$, $SD = 47$) and experimental ($M = 269$, $SD = 46$) groups were very close and the relatively large standard deviations of both indicate the large degree of variability common to both groups on this variable. This indicates that the pre-test scores of the control group and the pre-test scores of the experimental group were comparable and the experiment started off with both groups having similar leadership aptitude abilities. As a result, it is reasonable to conclude the groups do not differ to a degree that would introduce a bias into the study.

H1.2: There is no significant difference between the pre-test scores of the control group and the post-test scores of the control group.

The next step was to determine if any impact of history or maturation occurred during the period of the treatment. In other words, would external factors or the act of participating in the study and/or taking the leadership aptitude test twice affect the post-test results? In order to test the effect of participating in the study on the post-test scores, the pre-test and post-test scores in the control group were compared. The assumption is that history and maturation effects would not be an issue. As the researcher did not expect to see any significant differences in the scores,

H1.2 tests that there is no difference. Using a paired t-test, the researcher compared the pre-test and the post-test scores of the control group. The results of that test are summarized in Table 5.

Table 5

Paired Samples Test of Pre-test vs. Post-test in the Control Group

	Mean Change	Std. Deviation	Std. Error Mean	t	df	Significance (2-tailed)
Pair 1 PostTest - PreTest	-3.611	13.004	2.167	-1.666	35	.105

As seen in Table 5, there is no significant difference in the pre-test scores and the post-test scores in the control group ($t(35) = -1.666$, $p = .105$). Table 3 shows that the leadership scores on the pre-test for the control ($M = 272$, $SD = 47$) and post-test for the control ($M = 276$, $SD = 46$) were very close and the relatively small difference in standard deviation indicate a small degree of

variability between the two sets of scores. This suggests that history and maturation effects were unlikely from participating in the study. As a result of this finding, it would be more likely that any differences found between the pre-test scores and the post-test scores in the experimental group to the effect of the treatment of the leadership training on the students and not the result of historical or maturation effects.

H1.3: There will be a significant increase between the pre-test and post-test scores of the students in the experimental group.

After the first two hypotheses confirmed that the control and experimental groups contained students with similar leadership pre-test scores and that the change in pre/post-scores was unlikely to be affected by the time lapse between the two tests and the participation in the study, the last hypothesis was tested to provide an answer to RQ1 which asked if completeing the VLeader training did improve post-test scores. As the purpose of the VLeader software is to improve leadership abilities, the researcher expected there would be an increase between the pre-test and post-test scores of the students in the experimental group. The results of the paired t-test used to test that hypothesis are found in Table 6.

Table 6

Paired Samples Test Pre-test vs. Post-test Experimental Group

	Mean	Std. Deviation	Std. Error Mean	t	df	Significance (2-tailed)
Pair 1 PostTest - PreTest	-14.906	36.221	6.403	-2.328	31	.027

Table 6 showed there was a significant difference between the pre-test scores and the post-test scores in the experimental group ($t(31) = -2.328$, $p = .027$). Table 3 shows that the leadership scores on the pre-test for the experimental group ($M = 269$, $SD = 46$) and post-test ($M = 284$, $SD = 41$) groups did change with the mean score increasing 15 points and the standard deviation decreasing by five points and showing less variability.

Leadership Aptitude Scores and Demographic Groups

RQ2: Does completing the leadership simulation training program VLeader improve leadership aptitude scores based on demographic differences of the students?

The next step in analyzing the data was to test the demographic information that had been collected to see if there was any demographic group that responded better to the treatment than the others. Some of the demographic data that was collected from the students in this study lacked enough data or diversity to provide meaningful insights. Those questions included home state, race, and family income level. However, data collected on gender, age, class rank, and GPA did gather enough information to be analyzed in a meaningful way and those tests are discussed in the following section.

H2.1: There is a difference in the change in pre/post leadership aptitude scores of the students in the experimental group based on gender.

The first demographic hypothesis to be tested speculated that the simulation training would affect male and female students differently based on their interest in computer games and simulations (Lim, 2011; VerBruggen, 2012; Ya-Hui, Yi-Chun, & Huei-Tse, 2015) and/or their willingness to put more time into practicing on the simulation. In order to test this hypothesis, descriptive statistics and a one-way ANOVA test were used to analyze the data from the experimental group. The results of those test are summarized in Table 7.

Table 7

Change in Leadership Scores from Pre-Test to Post-Test for Experimental Group By Gender

One-Way ANOVA

Gender	N	Mean	Std Dev	Std Err	Significance
Female	17	13.12	44.496	10.792	
Male	15	16.93	25.181	6.502	.772
Total	32	14.91	36.221	6.403	

Levene's = .959, (df=1, 30) p = .335

Table 7 presents ANOVA results by gender for the experimental group (F = .086, df = 1, 30, p = .772). The number of males and females were fairly even with 17 female students and 15 male students in the experimental group. The Levene's Test for homogeneity of variance was not significant so a one-way ANOVA was used. The analysis shows that the change in pre-test/post-test scores was greater for males (M=16.93, SD= 25.181) than for females (M=13.12, SD=44.496) but that the variability in the standard deviation for females was noticeably higher than it was for the males. Essentially, the large variability in scores by gender is such that any difference between genders is potentially obscured and thus not statistically significant. However, when analyzing the raw data, it is clear that both the highest increase in scores and the lowest decrease in scores came from female students. While these numbers were not so large as to be considered outliers, they are large enough to explain why the standard deviation in the change of scores would be larger and the mean would be similar between the genders. A further discussion of this issue can be found in Chapter Five.

H2.2: There is a signifiant difference in the change in the pre/post leadership aptitude scores of the students in the experimental group based on age.

This hypothesis speculated that students might respond differently to the leadership training based on age. In order to test this hypothesis, descriptive statistics and a one-way ANOVA test were used to analyze the data from the experimental group.

Table 8

Change in Leadership Scores from Pre-Test to Post-Test for Experimental Group By Age

One-Way ANOVA

Age	N	Mean	Std Dev	Std Err	Significance
19	2	84.50	12.021	8.5	
20	9	14.56	18.836	6.279	
21	13	10.31	45.522	12.625	
22	5	4	22.880	10.232	.136
23	2	9	1.414	1	
24	1	5			
Total	32	14.91	36.221	6.403	

Levene's = .583, (df=4, 26) p = .677

Table 8 presents the results of ANOVA by age for the experimental group (F = 1.862, df = 5, 26, p = .136). The age of the students ranged from 19 to 24 with a mean age of 21. The analysis shows that the change in pre-test/post-test scores did not follow any identifiable pattern as the age of the participants increased from 19 (M=84.50) to 20 (M=14.56) to 21 (M=10.31) to 22 (M=4) to 23 (M=9) to 24 (M=5). Unfortunately, due to the small number of students in several of the groups, any changes observed in the mean and standard deviation values could not provide any reliable

information about the effect of age on the change in test scores. Table 8 presents the results of the one-way ANOVA test. Although the hypothesis (H2.2) speculated that there might be a difference in the way students responded to the VLeader training based on their age, no statistically significant difference was found.

H2.3: There is a significant difference in the change in the pre/post leadership aptitude scores of the students in the experimental group based on class level (junior/senior.)

The third demographic hypothesis speculated that the effect of the simulation training would affect students differently based on their class rank with the assumption that students who had an additional year of college had more opportunities to learn and practice leadership skills.
Table 9 presents the results of the ANOVA by class standing for the experimental group.

Table 9

Change in Leadership Scores from Pre-Test to Post-Test for Experimental Group By Class Rank One-Way ANOVA

Class Rank	N	Mean Score Change	Std Dev	Std Err	Significance
Junior	16	28.81	38.561	9.640	
Senior	16	1.00	28.493	7.123	.027
Total	32	14.91	36.221	6.403	

Levene's = 3.013, (df=1, 30) p = .093

The number of juniors and seniors in the group was even with 16 students in each group. The analysis shows that the change in pre-test/post-test scores was greater for Juniors (M=28.81,

SD=38.561) than for Seniors (M=1, SD=28.493). As seen in Table 9, the changes in the pre-test/post-test scores were significant between juniors and seniors in the experimental group (F = 5.384, df = 1, 30, p = .027). Hypothesis H2.3 speculated there would be a statistically significant difference found in the way the VLeader training affected students based on class standing. However, it is interesting to note that while the assumption behind the hypothesis was that additional college experience seniors had would cause a greater change in their pre-test to post-test scores, the reverse was true and juniors had the larger increase between their pre-test and post-test scores. Students in the junior group, had a score change, on average, 27.81 points higher than students in the senior group. Possible reasons for this finding are discussed in Chapter 5.

H2.4: There is a significant difference in the change in the leadership aptitude scores of the students in the experimental group based on their GPA.

Table 10

Change in Leadership Scores from Pre-Test to Post-Test for Experimental Group By GPA

One-Way ANOVA

GPA	N	Mean	Std Dev	Std Err	Significance
2.0 - 2.49	4	10	5.099	2.550	
2.5 - 2.99	12	21.33	53.798	15.530	
3.0 - 3.49	6	2.67	13.064	5.333	.781
3.5 – 4.0	10	16.50	26.639	8.424	
Total	32	14.91	36.221	6.403	

Levene's = 2.276, (df=3, 28) p = .102

The forth demographic hypothesis speculated that stronger students would learn more from the VLeader training due to their proven ability to be successful with other types of instruction. The researcher used a one-way ANOVA after determining the Levene's Test for homogeneity of variance was not significant.

Table 10 presents the results of ANOVA results by GPA for the experimental group ($F = .361$, $df = 3, 28$, $p = .781$). The changes in the pre-test/post-test scores were not significant between GPA groups. The pattern of the change in pre/post-test scores did not follow the expected pattern of students with a higher GPA experiencing the largest increase in test scores. Comparing the two largest groups, the students in the 2.5-2.99 GPA group ($M=21.33$, $SD=53.798$) had, on average, a 4.83 larger increase in test scores than the students with a higher GPA in the 3.5-4.0 GPA group ($M=16.50$, $SD=26.639$). Although hypothesis (H2.4) speculated that there might be a difference in the way the training affected students based on GPA, no statistically significant difference was found.

Leadership Aptitude Scores and Time Spent in VLeader

RQ3: Is there a difference in the leadership aptitude scores of the students in the experimental group based on time spent using the simulation?

The final research question in this study focused on the VLeader software. Since the software allowed students to spend extra time practicing the skills they had learned in the training, would the students spending the extra time practicing score higher on the leadership aptitude test at the end of the study? Hypothesis 3.1 endevered to answer this question.

H3.1: There will be a difference in the leadership aptitude scores of the students in the experimental group based on time spent using the simulation.

In order to test this hypothesis, it was necessary to group subjects based on time spent using the simulation. The VLeader software kept track of the amount of practice each participant invested in the leadership training. Some participants in the experimental group only spent the mimimum amount of time necessary in the training program to complete the study and earn the extra credit in their Communications class (the Minimum group). Other participants completed the training and then spent additional time on the simulator in order to practice the leadership skills they had learned (the Extra group). Table 11 contains the mean post-test scores for both groups.

Table 11

Independent Samples t-test of VLeader Effort on the Post Test Scores in the Experimental Group

Effort Invested in VLeader Training	N	Mean Post Test Scores	Std. Deviation Post Test Scores	Std Error Mean	Significance
Minimum	16	265	35.9	8.975	.007
Extra	16	302	38.2	9.563	
Total	32				

Levene's = .005 (df = 30, 29.88) p = .946

Table 11 shows that the students were equally divided with 16 students spending the mimum time necessary on the simulator to complete the training and 16 other students who spend extra time on the simulator practicing. Participants who gave the minimum effort in the training program

(M=264) had a lower mean post-test score compared to students who put in extra effort (M=302). In order to determine if the difference between the groups was statistically significant, a t-test of independent samples was used to test the hypothesis. As Table 11 shows, there is a significant difference ($t(30) = -2.888$, $p = .007$) in the change in pre-test/post-test scores between the two groups. Students putting in the extra effort improved their scores, on average, 38 points more than those students doing only the minimum effort required.

Conclusion

Based on the data and findings from this chapter, three significant findings were identified. A significant difference was found (H1.3) between the mean pre-test and post-test scores of the participants who took the VLeader training and no significant difference was found (H1.2) between the mean pre-test and post-test score of the control group, suggesting that history and the test-taking were less likely to be factors and the treatment was more likely to be contributing to the improved leadership scores in undergraduate students who completed the VLeader training.

Another significant difference was found in the change between the pre and post-test scores of the experimental group (H3.1) between the students who gave a minimum effort to the VLeader training and those students who gave extra effort and practiced what they had learned. Only one of the demographic traits tested had any significant influence on the change in pre/post-test scores in the experimental group. It was (H2.3) class standing (Juniors/Seniors) with students in the junior group improving more than students in the senior group. These three findings and their application to teaching leadership skills at the undergraduate level will be discussed in detail in Chapter 5.

The other demographic traits tested in this study included: (H2.1) gender, (H2.2) age, and (H2.4) GPA. Those traits did not generate any significant differences between the groups. Additionally, the researcher did attempt to analyze the data based on other demographic factors

including race and income. Unfortunately, due to the lack of racial diversity in the sample and the lack of information on family income, no meaningful conclusions could be pulled from the samples on those topics. All tests and finding from this study are summarized in Table 12 which can be found at the beginning of Chapter 5.

CHAPTER FIVE

DISCUSSION AND RECOMMENDATIONS

Introduction

The main focus of this study was to examine the impact of the leadership training program VLeader on the leadership aptitude scores of undergraduate college students. The study examined the dependent variable of the change in leadership aptitude scores from the pre-test to the post-test and how that change was influenced by the treatment, the time spent using the simulation training, and demographic independent variables including gender, age, class rank and GPA. Table 12 provides a summary of the findings from Chapter 4.

Table 12

Summary of the Findings from Chapter 4

Hypothesis	IV	DV	Significance
H1.1	Control/Experimental	Pre-test Score	No
H1.2	Control	Pre/Post Score	No
H1.3	Experimental	Pre/Post Score	Yes
H2.1	Gender Group	Change in Pre/Post Score	No
H2.2	Age Group	Change in Pre/Post Score	No
H2.3	Class Rank Group	Change in Pre/Post Score	Yes
H2.4	GPA Group	Change in Pre/Post Score	No
H3.1	Minimum/Extra Group	Change in Pre/Post Score	Yes

As discussed in the first two chapters of this document, an important component of this study was the need to find alternate ways to teach leadership skills to undergraduate college students who are pursuing their education in virtual classrooms through e-learning instead of through the traditional classrooms on campus. The demand for leadership education for college students is high with the improvement of leadership skills consistently listed as one of the most important outcomes desired by college students (Greenwald, 2010), institutions of higher learning (Thompson, 2006) and employers (Freifeld, 2013; Sodhi, & Byung-Gak, 2008). Since virtual classrooms provide fewer opportunities for students to practice their leadership skills (Pittinsky, 2005), there is a need for more tools to help professors teach e-learning students. The use of computer-based training utilizes the same skill set as the one needed to take e-learning classes. And experience has long been regarded as important in the development of leadership skills (Datar et al., 2010; Zemke & Zemke, 2001). So the use of a simulation training program to teach leadership would seem to be a perfect fit for the growing number of students (Allen et al., 2013) choosing to take classes online. For this reason, the exploration of alternative educational technologies led to this study which tests the effectiveness of computer software simulation training by measuring the change in leadership aptitude scores after completing the VLeader training program.

In this chapter, the findings of each of the research questions are discussed in relation to what it means to the study's goal of finding instructional technology that can be used to teach leadership skills to undergraduate students using leadership simulation training software in a virtual classroom. Table 12 summarizes the research hypothesis and the findings from Chapter 4. In the next section, each hypothesis and finding will be examined.

Discussion of Research Questions and Hypothesis

Discussion of RQ1:

Does completing the leadership simulation training program VLeader improve the leadership aptitude scores of undergraduate college students?

The findings from the first research question provided several pieces of important information. First, H1.1 determined that the control and experimental groups contained students with similar leadership aptitude scores before the experiment began. This served as another check for any bias from the volunteer method of assignment of participants to the control and experimental groups. Since no significant difference was found between the groups, concern about possible bias was reduced. Then, H1.2 confirmed that there was no significant difference between the leadership aptitude scores between the pre-test and post-test in the control group. This suggested that neither the passage of time nor the act of participating in the study affected the students' scores. And finally, the t-test on H1.3 determined that there was a statistically significant difference between the pre-test scores and the post-test scores of the students who completed the VLeader training. This suggested that the VLeader training is successful in teaching students leadership skills since the post test scores of students in the experimental group were, on average, 15 points higher than their pre-test scores.

As discussed in Chapters 1 and 2 of this document, there is a need for new methods of teaching leadership now that more students (Allen et al., 2013) are opting to take undergraduate college classes online. Without the traditional opportunities to practice leadership skills in the classroom and on the campus, students need a way to practice leadership before entering the job market where leadership skills are in great demand (Freifeld, 2013). This study shows that simulation leadership training can improve leadership skills through elearning. The results of this study showed that students taking the VLeader training in the experimental group, significantly

increased their post test scores, an average of 15 points above their pre-test scores. This is an important option for professors in the future who may choose to use the VLeader software and included workbook as a replacement for leadership textbooks in elearning classes.

Discussion of RQ2:

Does completing the leadership simulation training program VLeader improve leadership aptitude scores based on demographic differences of the students?

In some of the demographic groups examined, there was not enough information collected for any meaningful analysis. For example, students seemed unwilling or unable to provide information on their family's incomes. And, although information was available on home state and race, there was not enough diversity in either category to compare groups and find any meaningful differences between them.

In three of the demographic groups analyzed, gender (H2.1), age (H2.2), and GPA (H2.4) data was collected and analyzed, however, no significant difference was found between the demographic groups. Although men are commonly considered to be more interested in computer games and simulations, in this study, no significant difference was found in H2.1 between the change in pre/post test scores for men verses women. It is interesting to note that the change in scores for men had a smaller standard deviation than for women. In looking at the raw data, women had the largest increase in scores and the largest decrease in scores from the pre-test to the post-test after taking the VLeader training. This could mean that the VLeader training works more consistently for males students than it does for female students. It could also mean that some women are just not intersted in computer games and simulations so they do not learn well on the trainer; but, some women are attracted to computer games and respond very well to simulations. This could

explain the two extremes in the women's scores. It may also mean that women who like games and simulations will be better candidates for simulation training.

While age seemed a likely category to explore due to the perception that older students would have more experience in leadership situations, no difference was found in H2.2 in the change in pre/post-test scores bewtween the age groups. It is possible that another sample containing more variation in age would have revealed additional differences. However, in this study, no significant differences were found between the ages of 19 and 26.

No significant difference was found in H2.4 in the change of pre/post test scores for students in different GPA groups. It seemed logical that good students would perform better on the training software than students who have lower grades. However, the information that was collected did not show that pattern. In some cases, students with lower grade point averages actually did better than students with higher grades. This is an interesting finding because it may indicate that the training program works for students who do not respond as well to traditional teaching methods and/or that simulation training can be used to help students overcome past academic deficiencies. Perhaps the simulation software works better for different types of learners. Although no statistically significant differences were found in the GPA analysis of this study, enough information was collected to show that students in different grade categories did have a slightly different response to the training. Further study may reveal a meaningful difference in how simulation software works for different types of learners.

The only demographic group that experienced a significant difference in the change in their scores from the pre-test to the post-test was H2.3 in class rank. In this analysis, students in the experimental group were compared by their class rank (juniors and seniors.) It seemed logical that students with an additional year of college experience would show a greater improvement in pre to

post-test scores on the leadership aptitude test. However, in this study, the juniors improved an average of 27 points more between the pre and post test than the seniors after they all took the leadership training. It is possible that juniors had less pressure on them than the senior students did. Since this study finished in April, senior students certainly may have been focused on their graduation instead of the leadership training.

It is also interesting to look at the pre-test scores and the post-test scores of each of the groups. The juniors pre-test (M = 254, SD = 55) and post-test (M = 283, SD = 51). The seniors pre-test (M = 283, SD = 27) and post-test (M = 284, SD = 30). Although the juniors increased their scores, on average, 27 points from pre to post, the juniors ended up at almost exactly the same average post-test score the senior students did (M Jr. = 283 and M Sr. = 284). So the juniors had the most improvement between the two groups after taking the VLeader training. But the senior students started off with a higher average leadership score than the juniors and had a smaller standard deviation indicating a lower level of variability. This is consistent with the original assumption that the additional year of college would give students an advantage on the leadership aptitude exam. It may also indicate that senior students may have rushed through the leadership aptitude tests due to their busy schedules preparing for graduation and a general lack of focus as graduation approaches commonly referred to as "senioritis." It may also indicate that there is a maximum amount that can be taught through the simulation software alone without having a facilitator help the students process what they are learning. However, a statistically significant increase of 27 points, on average, on the leadership aptitude test for juniors indicates that something is happening and that would warrant additional research in the future. Research which incorporates freshmen and sophomore students in the study along with the juniors and seniors would help to

determine if the difference in class rank is only between the juniors and seniors or if it is also found between students in other class ranks as well.

Discussion of RQ3:

Is there a difference in the leadership aptitude scores of the students in the experimental group based on time spent using the simulation?

Students putting in extra effort using the training software scored an average of 38 points higher between their pre and post-test scores than those students only doing the minimum effort required. This may have been due solely to the affect of the VLeader software on the students' leadership skills. However, it may also have been due, in part, to differences between the type of students who were willing to put in the minimum effort on the software and those students who were willing to put in an extra effort. Perhaps the students who were willing to put in the extra effort had some higher interest or ability in leadership than the students who were only willing to put in the minimum time on the software. The extent of the impact of the extra time spent on VLeader could be a topic of future research. However, since the difference in pre and post-test scores was so large, at an average 38 points for students in the extra practice group, it does seem logical that the extra time spent practicing on the software did have a positive impact on test scores.

Limitations

Sample Size

Sixty-eight students participated in this study and the findings are suggestive and can provide insights into the possible use of this leadership training in the future. However, a sample this small cannot represent students in every demographic category. As discussed in chapter 4, the lack of racial diversity in the sample made it impossible to determine if race was a factor in the effectiveness of the treatment. In addition, the majority of the students in this study either did not know their

family income level or chose not to share that information. Therefore, it was impossible to determine if family income level was a factor in the effectiveness of the treatment. These specific issues help to illustrate that the small sample size was a limitation to this study.

Funding

This study used a nonprobability, convenience sampling method of asking for volunteers to complete the study. While this is not the ideal, random method of picking a sample from a population, this method was chosen due to the time required from each participant and the expense involved in providing the training to the members of the experimental group. Randomly choosing members to take the training may have helped to determine how many students would actually complete the training if it was available to them; however, that was not the research question in this study. The question being asked was if the participant completed the training, would his leadership aptitude score change? However, the limited funding available to conduct this research study was a limitation. If additional funding had been available, a random sampling method could have been used to select the participants in this study. More funding would also have allowed the study to include a larger sample of participants.

Limited Contact with Participants

The researcher's lack of contact with the study participants was also a limitation of this study. The VLeader training program was designed to be used in a classroom environment where the participants discussed the training with the instructor and with one another. In addition, there were exercises and assignments that teachers and professors could use with their students as they completed the training. In this study, the participants completed the training with limited help from the researcher and with no contact with one another. This lack of contact between instructor and

student was a limitation to providing the full value of the VLeader training to the participants in this study.

Recommendations for Further Research

As with all studies, future research on this topic should include repeating this study to verify the findings. In a future study, a larger, randomly chosen sample of participants could be used to address the limitations mentioned in the previous section.

In other future research studies, the VLeader training could be facilitated by an instructor in a virtual classroom. In this type of study, the VLeader software could be used instead of a leadership textbook. This would allow the researcher to compare classes that used the VLeader software with classes that used a traditional leadership textbook.

Additional studies might also focus on the most effective time to use the VLeader software in an undergraduate student's college career. This study indicated that using the software during the student's senior year was not as effective as using it during the junior year. Additional research might compare freshman, sophomore, and junior years to see which of those is most useful.

Future research studies could also focus on gender, age or GPA to see if there is a segment of students who respond better to simulation training than others. This study found some interesting differences in gender and GPA that were not statistically significant in this study but might lead to significant findings in future studies.

Conclusion

The experiment in this study found that students who spent time using the VLeader training program (H1.3) significantly improved their leadership aptitude scores by an average of 15 points. In addition, students who put extra effort into practicing their skills on the VLeader program (H3.1)

significantly improved their scores, an average of 38 points more, than students who only put the minimul effort into the VLeader training program.

Based on the limited sample in this study, VLeader Training Software demonstrated a degree of effectiveness in helping students improve their leadership aptitude scores. It may prove to be a useful option for teachers and professors to use in virtual classrooms to improve leadership skills. At the very least, it has proven worthy of further research. Based on the demand for leadership skills in society and the growth of virtual classrooms in higher education, this area of instructional technology research will continue to grow in the future.

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Appendix A: Invitation to Participate in Study

Earn Extra Credit by Participating in a Leadership Aptitude Study!

I need a few good men and women to help me complete my dissertation research. It's fast! It's easy! And you can do it from your own home in your pajamas!

All you need to do is fill out the attached "Informed Consent Form" and turn it into your Comm professor. That gets you into the study. Next, you will follow the link at the bottom of this page and take a survey. Then, a month later, log on and take a second survey. Each survey should take you less than 15 minutes to complete. Is 30 minutes of your life worth some extra credit in your Comm class? Of course it is!

Plus, at the end of the first survey, you will have the opportunity to sign up for 12 hours of leadership training on a leadership simulation software called VLeader. This is leadership training simulation software that you can run on your computer like a computer game. It is a $50 value that will be given free to the first 30 students who volunteer to participate. The only requirement is that you spend 12 hours on the simulator in the next month before you take the second survey. (Note: Your scores on the simulator and the time you spend on the simulator will be saved and sent to me automatically.) In addition to the extra credit for your Comm class, students who complete the leadership simulation training will also receive a certificate from the SimuLearn company saying that they successfully completed the VLeader Leadership Training Program. This accomplishment can be listed on your resume!

I am only purchasing 30 copies of the software for this study. So, sign up fast if you want this opportunity for FREE leadership training! When the 30 downloads of the software are gone, they are gone. Sign up NOW!

https://iup.qualtrics.com (survey link here)

Appendix B: Informed Consent Form

You are invited to participate in a research project assessing leadership aptitude scores conducted by Jennifer Forrest, doctoral student in the Communications Media and Instructional Technologies doctoral program at Indiana University of Pennsylvania.

The following information is being provided to you so you can make an informed decision to participate or not participate.

Your Involvement in this Study:
If you choose to participate, sign this form and turn it into your Comm professor. Next, follow the link at the bottom of this page and take a survey. Then, a month later, log on and take a second survey. Each survey should take you less than 15 minutes to complete.

At the end of the first survey, you will have the opportunity to sign up for 12 hours of leadership training on a leadership simulation software called VLeader. This is a leadership training simulation software that you can run on your computer like a computer game. It is a $50 value that will be given free to the first 30 students who volunteer to participate. The only requirement is that you spend 12 hours on the simulator in the next month before you take the second survey. (Note: Your scores on the simulator and the time you spend on the simulator will be saved and sent to me automatically.) In addition to the extra credit for your Comm class, students who complete the leadership simulation training will also receive a certificate from the SimuLearn company saying that they successfully completed the VLeader Leadership Training Program. This accomplishment can be listed on your resume!

Your participation in this study is voluntary.
You are free to choose if you want to participate in this study or not participate. If you decide later that you don't want to be part of this research study, you can notify the lead researcher by calling, e-mailing, or writing to her, and she will put all of your data sheets in the shredder and not include you in the study. Withdrawing from the study will not result in any negative consequences for you.

Thank you for consideration and assistance with this study. If you have any questions or would like additional information, you may contact me directly:

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1046 Barnett Hill Road
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Informed Consent Form (page 2)

Or you may contact my Faculty Advisor:

Dr. Jay Start
Department of Communications Media
IUP
B-35 Davis Hall
570 South Eleventh Street
Indiana, PA 15705
724-357-2490
jstart@iup.edu

If you would like to help me in my study, please print and sign your name on this page and return to me. Please keep the attached page for your records and to find the link for the survey. You may complete the survey immediately after turning in this form.

VOLUNTARY CONSENT FORM:
I have read and understand the information on the form and I consent to volunteer to be a subject in this study. I understand that my responses are completely confidential and that I have the right to withdraw at any time.

Name (PLEASE PRINT):_____

Signature: _____

Date: _____

IUP email address: _____

Appendix C: Permission to Use Content

PEARSON

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May 8, 2013

PE Ref # 177313

JENNIFER FORREST
Indiana University of Pennsylvania
Indiana, PA 15701

Dear Jennifer Forrest

You have our permission to include content from our text, ***DEVELOPING MANAGEMENT SKILLS, 3rd Ed. by WHETTEN, DAVID A.,*** in your dissertation on the effectiveness of computer simulations on teaching leadership skills to college undergraduate students at INDIANA UNIVERSITY OF PENNSYLVANIA.

Content to be included is:
pp. 47-49, 294-295, 292-294, 534-535, 176-178
Cognitive Style Instrument, Using Influence Strategies,
Gaining Power and Influence, Team Development Behaviors,
How Creative Are You?

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Sincerely,
Vineta Lewis, Permissions Supervisor

Appendix D: Invitation to Participate in VLeader Training

This is the last question on the pretest

This survey you have just taken is part of my dissertation research. My study will compare leadership aptitude scores between undergraduate students who take a leadership simulation training program with students who do not take it. The leadership simulation training program is very much like a computer game where the player is trying to accomplish leadership goals to advance through the game. I need 30 volunteers to take this training for my study. Students who take this training will download software which will allow them to log in and run the leadership training simulator VLeader from any computer. The scores on the simulator and the time spent using the simulator, will then be sent to me for my study. Students taking the training must spend at least 12 hours on the simulator before they take the second leadership aptitude survey in 4 weeks.

I am paying to purchase 30 downloads for my study. This is a $50 value for each participant. I need 30 volunteers to become part of my experimental group and use the program. If you would like to volunteer, indicate that on the question below. The first 30 students to volunteer will be selected for this training. If selected, you will receive instructions through e-mail on where to go to download your software to run the training software. You will be able to contact me through the Facebook group "Leadership Simulation Training Group" or through email at j.l.forrest@iup.edu with any questions or comments you may have as you use the software.

When you complete your 12 hours, the VLeader company will give you a certificate stating that you completed their Leadership Training Course. This certificate can be listed on your resume.

It is not necessary to volunteer for this training to participate in this study. Taking the survey today and the survey again in 4 weeks will be enough to receive your extra credit in your Comm class.

If you would like to volunteer to be one of the 30 students to receive the FREE Leadership Training, indicate below by selecting "yes." I will take the first 30 volunteers that I receive for this opportunity

No Thank you. I do NOT want the extra leadership training.

Yes! I am willing to spend at least 12 hours using the leadership training simulator in the next four weeks. Please sign me up for the training!

Thank you for your time.

Appendix E: Thank You Letter

(Sent to participants after their second survey was received)

Thank you for your Participation in the Leadership Training Study!

This e-mail is your notification that you, (insert participant name here) have successfully completed your participation in the Leadership Training Study.

You need to show this e-mail to your professor to receive
your extra credit in your Comm class.

I hope you have enjoyed your experience in this study. I would welcome any questions or comments that you may have. Feel free to contact me at j.l.forrest@iup.edu.

Sincerely,

Jennifer Forrest
Doctoral Student
COMIT Program

Appendix F: Survey Instrument

Comm 395 Survey

Q1 Informed Consent Form

This survey attempts to measure leadership aptitude.

Procedures

In order to participate in this study, you will be asked to complete a survey today and to complete a second survey next month. Both of these surveys are designed to measure your leadership aptitude.
In the first survey, participants will also be given the opportunity to sign up to receive leadership training using a leadership simulation training software. This is an extra opportunity for leadership training and is not a requirement of participating in this study. Students who volunteer for this training will be given a link to download the software and will be asked to spend at least 12 hours completing the training before taking the second survey. Please do not sign up for this training if you are not able and willing to spend at least 12 hours completing the training in the next month. We will be comparing scores from the first survey with scores from the second survey and scores from those who received the leadership simulation training with the scores from those who did not complete the leadership training. In this first survey, you will be asked a variety of questions. The first ten questions are demographic questions used for comparison between test takers only. They do not measure your leadership aptitude. The remaining 120 questions in the survey are multiple choice and should take the average person less than 15 minutes to complete. Please answer the questions with the first answer that pops into your mind. There are no right or wrong answers to this test. Each answer is worth a different number of points. Scores are totaled at the end of the test to give an aptitude score.

I have read and understood the above consent form and desire of my own free will to participate in this study.

- ❍ Yes (1)
- ❍ No (2)

If No is selected, then skip to the end of the survey.

Q2 Section One - General Demographic Questions (The first ten questions are demographic questions used for comparison of data at the end of the study. These questions do NOT measure your leadership aptitude.) What is your gender?

- ❍ Male (1)
- ❍ Female (2)

Q3 What is your age?

Q4 Which of these best describes you?

- ❍ Freshman (1)
- ❍ Sophomore (2)
- ❍ Junior (3)
- ❍ Senior (4)
- ❍ Graduate Student (5)
- ❍ Not a current college student (6)

Q5 What is the highest level of education you have completed?

- ❍ Less than High School (1)
- ❍ High School / GED (2)
- ❍ Some College (3)
- ❍ 2-year College Degree (4)
- ❍ 4-year College Degree (5)
- ❍ Masters Degree (6)
- ❍ Doctoral Degree (7)
- ❍ Professional Degree (JD, MD) (8)

Q6 What is your major?

- ❍ Communications (1)
- ❍ Other (Please specify) (2) _____

Q7 What is the estimated number of college credits you have acquired? (Include all credits completed, transferred and credits for courses you are currently taking.)

- ❍ 19 or less (1)
- ❍ 20 - 39 (2)
- ❍ 40 - 59 (3)
- ❍ 60 - 79 (4)
- ❍ 80 - 99 (5)
- ❍ 100 - 119 (6)
- ❍ 120 - 139 (7)
- ❍ 140 - 159 (8)
- ❍ 160 or more (9)

Q8 What is your current estimated overall GPA? (grade point average)

- ❍ Below 2.0 (1)
- ❍ 2.0 - 2.49 (2)
- ❍ 2.5 - 2.99 (3)
- ❍ 3.0 - 3.49 (4)
- ❍ 3.5 - 4.0 (5)

Q9 What is your race/ethnicity?

- ❍ American Indian or Alaska Native (1)
- ❍ Asian (2)
- ❍ African American (3)
- ❍ Hispanic or Latino (4)
- ❍ Native Hawaiian or Other Pacific Islander (5)
- ❍ Caucasian (6)
- ❍ Other (7)

Q10 In which state did you reside before coming to IUP?

- ❍ Alabama (1)
- ❍ Alaska (2)
- ❍ Arizona (3)
- ❍ Arkansas (4)

- California (5)
- Colorado (6)
- Connecticut (7)
- Delaware (8)
- District of Columbia (9)
- Florida (10)
- Georgia (11)
- Hawaii (12)
- Idaho (13)
- Illinois (14)
- Indiana (15)
- Iowa (16)
- Kansas (17)
- Kentucky (18)
- Louisiana (19)
- Maine (20)
- Maryland (21)
- Massachusetts (22)
- Michigan (23)
- Minnesota (24)
- Mississippi (25)
- Missouri (26)
- Montana (27)
- Nebraska (28)
- Nevada (29)
- New Hampshire (30)
- New Jersey (31)
- New Mexico (32)
- New York (33)
- North Carolina (34)
- North Dakota (35)
- Ohio (36)
- Oklahoma (37)
- Oregon (38)
- Pennsylvania (39)
- Rhode Island (40)
- South Carolina (41)
- South Dakota (42)
- Tennessee (43)

- ❍ Texas (44)
- ❍ Utah (45)
- ❍ Vermont (46)
- ❍ Virginia (47)
- ❍ Washington (48)
- ❍ West Virginia (49)
- ❍ Wisconsin (50)
- ❍ Wyoming (51)
- ❍ I do not live in the continental United States (52)

Q11 If not in the U.S., Where are you from? (City and County)

Q12 Indicate total family household income:
- ❍ under $25,000 (1)
- ❍ $25,000 - $29,999 (2)
- ❍ $30,000 - $34,999 (3)
- ❍ $35,000 - $39,999 (4)
- ❍ $40,000 - $49,999 (5)
- ❍ $50,000 - $59,999 (6)
- ❍ $60,000 - $84,999 (7)
- ❍ Over $85,000 (8)
- ❍ I do not know/prefer not to answer (9)

Q13 Section Two - Leadership Assessment Instrument - Part 1 of 5 In this instrument you should put yourself in the position of someone who must gather and evaluate information. The purpose is to investigate the ways you think about information you encounter. There are no right or wrong answers, and one alternative is just as good as another. Try to indicate the ways you do or would respond, not the ways you think you should respond. Follow these instructions: For each scenario there are three pairs of alternatives. For each pair, select the alternative that comes closest to the way you would respond. Answer each item. If you are not sure, make your best guess.
Suppose you are a scientist in NASA whose job it is to gather information about the moons of Saturn. Which of the following would you be more interested in investigating?
- ❍ a. How the moons are similar to one another (1)
- ❍ b. How the moons differ from one another (2)

Q14 Which of the following would you be more interested in investigating?
- ❍ a. How the whole system of moons operates (1)
- ❍ b. The characteristics of each moon (2)

Q15 Which of the following would you be more interested in investigating?
❍ a. How Saturn and its moons differ from Earth and its moon (1)
❍ b. How Saturn and its moons are similar to Earth and its moon (2)

Q16 NEW SCENARIO: Suppose you are the chief executive of a company and have asked division heads to make presentations at the end of the year. Which of the following would be more appealing to you?
❍ a. A presentation analyzing the details of the data (1)
❍ b. A presentation focused on the overall perspective (2)

Q17 Which of the following would be more appealing to you?
❍ a. A presentation showing how the division contributed to the company as a whole (1)
❍ b. A presentation showing the unique contributions of the division (2)

Q18 Which of the following would be more appealing to you?
❍ a. Details of how the division performed (1)
❍ b. General summaries of performance data (2)

Q19 NEW SCENARIO: Suppose you are visiting an Asian country, and you are writing home to tell about your trip. Which of the following would be most typical of the letter you would write?
❍ a. A detailed description of people and events (1)
❍ b. General impressions and feelings (2)

Q20 Which of the following would be most typical of the letter you would write?
❍ a. A focus on similarities of our culture and theirs (1)
❍ b. A focus on the uniqueness of their culture (2)

Q21 Which of the following would be most typical of the letter you would write?
❍ a. Overall, general impressions of the experience (1)
❍ b. Separate, unique impressions of parts of the experience (2)

Q22 NEW SCENARIO: Suppose you are attending a concert featuring a famous symphony orchestra. Which of the following would you be most likely to do?
❍ a. Listen for the parts of individual instruments (1)
❍ b. Listen for the harmony of all the instruments together (2)

Q23 Which of the following would you be most likely to do?
❍ a. Pay attention to the overall mood associated with the music (1)
❍ b. Pay attention to the separate feelings associated with different parts of the music (2)

Q24 Which of the following would you be most likely to do?
❍ a. Focus on the overall style of the conductor (1)
❍ b. Focus on how the conductor interprets different parts of the score (2)

Q25 NEW SCENARIO: Suppose you are considering taking a job with a certain organization. Which of the following would you be more likely to do in deciding whether or not to take the job?
❍ a. Systematically collect information on the organization (1)
❍ b. Rely on personal intuition or inspiration (2)

Q26 Which of the following would you be more likely to do in deciding whether or not to take the job?
❍ a. Consider primarily the fit between you and the job (1)
❍ b. Consider primarily the politics needed to succeed in the organization (2)

Q27 Which of the following would you be more likely to do in deciding whether or not to take the job?
❍ a. Be methodical in collecting data and making a choice (1)
❍ b. Mainly consider personal instincts and gut feelings (2)

Q28 NEW SCENARIO: Suppose you inherit some money and decide to invest it. You learn of a new high-technology firm that has just issued stock. Which of the following is most likely to be true of your decision to purchase the firm's stock?
❍ a. You would invest on a hunch (1)
❍ b. You would invest only after a systematic investigation of the firm (2)

Q29 Which of the following is most likely to be true of your decision to purchase the firm's stock?
❍ a. You would be somewhat impulsive in deciding to invest (1)
❍ b. You would follow a pre-set pattern in making your decision (2)

Q30 Which of the following is most likely to be true of your decision to purchase the firm's stock?
❍ a. You could rationally justify your decision to invest in this firm and not in another (1)
❍ b. It would be difficult to rationally justify your decision to invest in this firm and not another (2)

Q31 NEW SCENARIO: Suppose you are being interviewed on TV, and you are being asked the following questions. Which alternative would you be most likely to select?How are you most likely to cook?
❍ a. With a recipe (1)
❍ b. Without a recipe (2)

Q32 How would you predict the Super Bowl winner next year?
❍ a. After systematically researching the personnel and records of the teams (1)
❍ b. On a hunch or by intuition (2)

Q33 Which games do you prefer?
❍ a. Games of chance (like Bingo) (1)
❍ b. Chess, checkers, or Scrabble (2)

Q34 NEW SCENARIO: Suppose you are a manager and need to hire an executive assistant. Which of the following would you be most likely to do in the process?

- ❍ a. Interview each applicant using a set outline of questions (1)
- ❍ b. Concentrate on your personal feelings and instincts about each applicant (2)

Q35 Which of the following would you be most likely to do in the process?

- ❍ a. Consider primarily the personality fit between yourself and the candidates (1)
- ❍ b. Consider the match between the precise job requirements and the candidates' capabilities (2)

Q36 Which of the following would you be most likely to do in the process?

- ❍ a. Rely on factual and historical data on each candidate in making a choice (1)
- ❍ b. Rely on feelings and impressions in making a choice (2)

Q37 Part 2 15 Questions Indicate, by checking the appropriate item, how often you use each of the following strategies for getting others to comply with your wishes.

Choose from a scale of 1 to 5, with 1 being rarely; 3 being sometimes; and 5 being always.

	1 Rarely (1)	2 (2)	3 Sometimes (3)	4 (4)	5 Always (5)
1. "If you don't comply, I'll make you regret it." (1)	❍	❍	❍	❍	❍
2. "If you comply, I will reward you." (2)	❍	❍	❍	❍	❍
3. "These facts demonstrate the merit of my position." (3)	❍	❍	❍	❍	❍
4. "Others in the group have agreed; what is your decision?" (4)	❍	❍	❍	❍	❍
5. "People you value will think better (worse) of you if you do (do not) comply." (5)	❍	❍	❍	❍	❍
6. "The group needs your help, so do it for the good of us all." (6)	❍	❍	❍	❍	❍
7. "I will stop nagging you if you comply." (7)	❍	❍	❍	❍	❍
8. "You owe me compliance because of past favors." (8)	❍	❍	❍	❍	❍
9. "This is what I need; will you help out?" (9)	❍	❍	❍	❍	❍
10. "If you don't act now, you'll lose this opportunity." (10)	❍	❍	❍	❍	❍
11. "I have moderated my initial position; now I expect you to be equally reasonable." (11)	❍	❍	❍	❍	❍
12. "This request is consistent with other decisions you've made." (12)	❍	❍	❍	❍	❍

13. "If you don't agree to help out, the consequences will be harmful to others." (13)	❍	❍	❍	❍	❍
14. "I'm only requesting a small commitment [now]." (14)	❍	❍	❍	❍	❍
15. "Compliance will enable you to reach a personally important objective." (15)	❍	❍	❍	❍	❍

Q38 Part 3 30 Questions Rating from strongly agree to strongly disagree. Your answers should reflect your attitudes and behavior as they are now, not as you would like them to be. Be Honest. This instrument is designed to help you discover your level of competency in gaining power and influence so you can tailor your learning to your specific needs. The next set of questions are based on this scenario: In a situation where it is important to obtain more power:

	6 Strongly Agree (1)	5 Agree (2)	4 Slightly Agree (3)	3 Slightly Disagree (4)	2 Disagree (5)	1 Strongly Disagree (6)
1. I constantly strive to become highly proficient in my line of work. (1)	❍	❍	❍	❍	❍	❍
2. I always express friendliness, honesty, and sincerity toward those with whom I work. (2)	❍	❍	❍	❍	❍	❍
3. I always put forth more effort and take more initiative than expected in my work. (3)	❍	❍	❍	❍	❍	❍
4. I strongly support organizational ceremonial events and activities. (4)	❍	❍	❍	❍	❍	❍
5. I form a broad network of relationships with people throughout the organization at all levels. (5)	❍	❍	❍	❍	❍	❍
6. I find something in which I can specialize that helps meet others' needs. (6)	❍	❍	❍	❍	❍	❍
7. I consistently send personal notes to others when they	❍	❍	❍	❍	❍	❍

accomplish something significant or when I pass along important information to them. (7)						
8. In my work I consistently strive to generate new ideas, initiate new activities, and minimize routine tasks. (8)	❍	❍	❍	❍	❍	❍
9. I consistently try to find ways to be an external representative for my unit or organization. (9)	❍	❍	❍	❍	❍	❍
10. I am continually upgrading my skills and knowledge. (10)	❍	❍	❍	❍	❍	❍
11. I strive very hard to enhance my personal appearance. (11)	❍	❍	❍	❍	❍	❍
12. I always work harder than most co-workers. (12)	❍	❍	❍	❍	❍	❍
13. I strongly encourage new members to support important organizational values by both their words and their actions. (13)	❍	❍	❍	❍	❍	❍
14. I work hard to get access to important information (14)	❍	❍	❍	❍	❍	❍
15. I constantly strive to maintain some part of my work that is unique to me; others don't duplicate it. (15)	❍	❍	❍	❍	❍	❍
16. I constantly strive to find opportunities to make reports about my work, especially to senior people. (16)	❍	❍	❍	❍	❍	❍
17. I work hard to maintain variety in the tasks that I do. (17)	❍	❍	❍	❍	❍	❍
18. I strive hard to keep my work connected to the central mission of the organization. (18)	❍	❍	❍	❍	❍	❍

Q39 Part 3 30 Questions, continued In this section, please select the appropriate rating from strongly agree to strongly disagree. Your answers should reflect your attitudes and behavior as they are now, not as you would like them to be. Be Honest. This instrument is designed to help you discover your level of competency in gaining power and influence so you can tailor your

learning to your specific needs. The next set of questions are based on this scenario: When trying to influence someone for a specific purpose:

	6 Strongly Agree (1)	5 Agree (2)	4 Slightly Agree (3)	3 Slightly Disagree (4)	2 Disagree (5)	1 Strongly Disagree (6)
19. I consistently emphasize reason and factual information. (1)	❍	❍	❍	❍	❍	❍
20. I feel comfortable using a variety of different influence techniques, matching them to specific circumstances. (2)	❍	❍	❍	❍	❍	❍
21. I work hard to reward others for agreeing with me, thereby establishing a condition of reciprocity. (3)	❍	❍	❍	❍	❍	❍
22. I always use a direct, straightforward approach rather than an indirect or manipulative one. (4)	❍	❍	❍	❍	❍	❍
23. I always avoid using threats or demands to impose my will on others. (5)	❍	❍	❍	❍	❍	❍

Q40 Part 3 30 Questions, continued In this section, please select the appropriate rating from strongly agree to strongly disagree. Your answers should reflect your attitudes and behavior as they are now, not as you would like them to be. Be Honest. This instrument is designed to help you discover your level of competency in gaining power and influence so you can tailor your learning to your specific needs. The next set of questions are based on this scenario: When resisting an inappropriate influence attempt directed at me:

	6 Strongly Agree (1)	5 Agree (2)	4 Slightly Agree (3)	3 Slightly Disagree (4)	2 Disagree (5)	1 Strongly Disagree (6)
24. I use resources and information I control to equalize demands and threats. (1)	❍	❍	❍	❍	❍	❍

25. I refuse to bargain with individuals who use high- pressure negotiation tactics. (2)	❍	❍	❍	❍	❍	❍
26. I explain why I can't comply with reasonable- sounding requests by pointing out how the consequences would affect my responsibilities and obligations. (3)	❍	❍	❍	❍	❍	❍

Q41 Part 3 30 questions, continued In this section, please select the appropriate rating from strongly agree to strongly disagree. Your answers should reflect your attitudes and behavior as they are now, not as you would like them to be. Be Honest. This instrument is designed to help you discover your level of competency in gaining power and influence so you can tailor your learning to your specific needs. The next set of questions are based on this scenario: When trying to influence those above me in the organization:

	6 Strongly Agree (1)	5 Agree (2)	4 Slightly Agree (3)	3 Slightly Disagree (4)	2 Disagree (5)	1 Strongly Disagree (6)
27. I help determine the issues to which they pay attention by effectively selling the importance of those issues. (1)	❍	❍	❍	❍	❍	❍
28. I convince them that the issues on which I want to focus are compatible with the goals and future success of the organization. (2)	❍	❍	❍	❍	❍	❍
29. I help them solve problems that they didn't expect me to help them solve. (3)	❍	❍	❍	❍	❍	❍
30. I work as hard to make them look good and be successful as I do working for my own success. (4)	❍	❍	❍	❍	❍	❍

Q42 Part 4
24 Questions In this section, please select the appropriate rating from strongly agree to strongly disagree. Your answers should reflect your attitudes and behavior as they are now, not as you would like them to be. Be Honest. This instrument is designed to help you discover your level of competency in gaining power and influence so you can tailor your learning to your specific needs.

The next set of questions are based on this scenario:
When attempting to build and lead an effective team:

	6 Strongly Agree (1)	5 Agree (2)	4 Slightly Agree (3)	3 Slightly Disagree (4)	2 Disagree (5)	1 Strongly Disagree (6)
1. I am knowledgeable about the different stages of development that teams can go through in their life cycles. (1)	❍	❍	❍	❍	❍	❍
2. When a team first forms, I make certain that all team members are introduced to one another at the outset. (2)	❍	❍	❍	❍	❍	❍
3. When the team first comes together, I provide directions, answer team members' questions, and clarify goals, expectations, and procedures. (3)	❍	❍	❍	❍	❍	❍
4. I help team members establish a foundation of trust among one another and between themselves and me. (4)	❍	❍	❍	❍	❍	❍
5. I ensure that standards of excellence--not mediocrity or mere acceptability--characterize the team's work. (5)	❍	❍	❍	❍	❍	❍
6. I provide a great deal of feedback to team members regarding their performance. (6)	❍	❍	❍	❍	❍	❍
7. I encourage team members to balance individual autonomy with interdependence among other team members. (7)	❍	❍	❍	❍	❍	❍

8. I help team members become at least as committed to the success of the team as to their own personal success. (8)	❍	❍	❍	❍	❍	❍
9. I help members learn to play roles that assist the team in accomplishing its task as well as building strong interpersonal relationships. (9)	❍	❍	❍	❍	❍	❍
10. I articulate a clear, exciting, passionate vision of what the team can achieve. (10)	❍	❍	❍	❍	❍	❍
11. I help team members become committed to the team vision. (11)	❍	❍	❍	❍	❍	❍
12. I encourage a win/win philosophy in the team: that is, when one member wins, every member wins. (12)	❍	❍	❍	❍	❍	❍
13. I help the team avoid "group-think" or making the group's survival more important than accomplishing its goal. (13)	❍	❍	❍	❍	❍	❍
14. I use formal process management procedures to help the group become faster, more efficient, and more productive, and to prevent errors. (14)	❍	❍	❍	❍	❍	❍
15. I encourage team members to represent the team's vision, goals, and accomplishments to outsiders. (15)	❍	❍	❍	❍	❍	❍
16. I diagnose and capitalize on the team's core competence. (16)	❍	❍	❍	❍	❍	❍
17. I encourage the team to achieve dramatic breakthrough innovations as well as small continuous improvements. (17)	❍	❍	❍	❍	❍	❍
18. I help the team work toward preventing mistakes, not just correcting them after-the-fact. (18)	❍	❍	❍	❍	❍	❍

Q43 Part 4 24 Questions, continued In this section, please select the appropriate rating from strongly agree to strongly disagree. Your answers should reflect your attitudes and behavior as they are now, not as you would like them to be. Be Honest. This instrument is designed to help you discover your level of competency in gaining power and influence so you can tailor your learning to your specific needs.
The next set of questions are based on this scenario:
When preparing for and conducting team meetings:

	6 Strongly Agree (1)	5 Agree (2)	4 Slightly Agree (3)	3 Slightly Disagree (4)	2 Disagree (5)	1 Strongly Disagree (6)
19. I make certain that the purpose of a meeting is clear. (1)	❍	❍	❍	❍	❍	❍
20. I ensure that the proper number and mix of people are invited to attend. (2)	❍	❍	❍	❍	❍	❍
21. I prepare an agenda for every meeting. (3)	❍	❍	❍	❍	❍	❍
22. I distribute the meeting agenda in advance, follow up after the meeting with minutes, and make certain that assignments are carried out. (4)	❍	❍	❍	❍	❍	❍
23. I have a clear idea of the stages an effective meeting should pass through, from start to finish. (5)	❍	❍	❍	❍	❍	❍
24. I manage difficult team members effectively through supportive communication, collaborative conflict management, and empowerment. (6)	❍	❍	❍	❍	❍	❍

Q44 Part 5 39 Questions For the following statements, select the answer that most closely describes how you feel about the statement.

	Strongly Agree (1)	Agree (2)	Somewhat Agree (3)	Somewhat Disagree (4)	Disagree (5)	Strongly Disagree (6)
1. I always work with a great deal of certainty that I am following the correct procedure for solving a particular problem. (1)	❍	❍	❍	❍	❍	❍
2. It would be a waste of time for me to ask questions if I had no hope of obtaining answers. (2)	❍	❍	❍	❍	❍	❍
3. I concentrate harder on whatever interests me than most people. (3)	❍	❍	❍	❍	❍	❍
4. I feel that a logical step-by-step method is best for solving problems. (4)	❍	❍	❍	❍	❍	❍
5. In groups I occasionally voice opinions that seem to turn people off. (5)	❍	❍	❍	❍	❍	❍
6. I spend a great deal of time thinking about what others think of me. (6)	❍	❍	❍	❍	❍	❍
7. It is more important for me to do what I believe to be right than to try to win the approval of others. (7)	❍	❍	❍	❍	❍	❍
8. People who seem uncertain about things lose my respect. (8)	❍	❍	❍	❍	❍	❍
9. More than other people, I need to have things interesting and exciting. (9)	❍	❍	❍	❍	❍	❍

10. I know how to keep my inner impulses in check. (10)	❍	❍	❍	❍	❍	❍
11. I am able to stick with difficult problems over extended periods of time. (11)	❍	❍	❍	❍	❍	❍
12. On occasion I get overly enthusiastic. (12)	❍	❍	❍	❍	❍	❍
13. I often get my best ideas when doing nothing in particular. (13)	❍	❍	❍	❍	❍	❍
14. I rely on intuitive hunches and feelings of "rightness" or "wrongness" when moving toward the solution of a problem. (14)	❍	❍	❍	❍	❍	❍
15. When problem solving, I work faster when analyzing the problem and slower when synthesizing the information I have gathered. (15)	❍	❍	❍	❍	❍	❍
16. I sometimes get a kick out of breaking the rules and doing things I am not supposed to. (16)	❍	❍	❍	❍	❍	❍
17. I like hobbies that involve collecting things. (17)	❍	❍	❍	❍	❍	❍
18. Daydreaming has provided the impetus for many of my more important projects. (18)	❍	❍	❍	❍	❍	❍
19. I like people who are objective and rational. (19)	❍	❍	❍	❍	❍	❍
20. If I had to choose from two occupations other than the one I now have, I would rather be a physician than an explorer. (20)	❍	❍	❍	❍	❍	❍
21. I can get along more easily with people if they belong to	❍	❍	❍	❍	❍	❍

about the same social and business class as myself. (21)						
22. I have a high degree of aesthetic sensitivity. (22)	❍	❍	❍	❍	❍	❍
23. I am driven to achieve high status and power in life. (23)	❍	❍	❍	❍	❍	❍
24. I like people who are sure of their conclusions. (24)	❍	❍	❍	❍	❍	❍
25. Inspiration has nothing to do with the successful solution of problems. (25)	❍	❍	❍	❍	❍	❍
26. When I am in an agreement, my greatest pleasure would be for the person who disagrees with me to become a friend, even at the price of sacrificing my point of view. (26)	❍	❍	❍	❍	❍	❍
27. I am much more interested in coming up with new ideas than in trying to sell them to others. (27)	❍	❍	❍	❍	❍	❍
28. I would enjoy spending an entire day alone, just "chewing the mental cud." (28)	❍	❍	❍	❍	❍	❍
29. I tend to avoid situations in which I might feel inferior. (29)	❍	❍	❍	❍	❍	❍
30. In evaluating information, the source is more important to me than the content. (30)	❍	❍	❍	❍	❍	❍
31. I resent things being uncertain and unpredictable. (31)	❍	❍	❍	❍	❍	❍
32. I like people who follow the rule, "business before pleasure." (32)	❍	❍	❍	❍	❍	❍
33. Self-respect is much more important than the respect of others. (33)	❍	❍	❍	❍	❍	❍
34. I feel that people who strive for perfection are unwise. (34)	❍	❍	❍	❍	❍	❍

35. I prefer to work with others in a team effort rather than solo. (35)	❍	❍	❍	❍	❍	❍
36. I like work in which I must influence others. (36)	❍	❍	❍	❍	❍	❍
37. Many problems that I encounter in life cannot be resolved in terms of right or wrong solutions. (37)	❍	❍	❍	❍	❍	❍
38. It is important for me to have a place for everything and everything in its place. (38)	❍	❍	❍	❍	❍	❍
39. Writers who use strange and unusual words merely want to show off. (39)	❍	❍	❍	❍	❍	❍

Q45 Thank you very much for participating! To complete the study you will need to retake this survey again in 4 weeks so we can compare your scores. Please enter your name and your IUP e-mail address below so we can send you a reminder when it is time to retake the survey. Name:

Q48 E-mail Address:

Q46 This is the last question on the survey. This survey you have just taken is part of my dissertation research. My study will compare leadership aptitude scores between undergraduate students who take a leadership simulation training program with students who do not take it. The leadership simulation training program is very much like a computer game where the player is trying to accomplish leadership goals to advance through the game. I need volunteers to take this training for my study. Students who take this training will be given a link to download the software which will allow them to log in and run the leadership training simulator VLeader from any computer. The scores on the simulator and the time spent using the simulator, will then be sent to me for my study. Students taking the training must spend at least 12 hours on the training before they take the second leadership aptitude survey in 4 weeks. I am paying to purchase this software for my study. This is a $50 value for each student. When you complete your 12 hours of training, the VLeader company will give you a certificate stating that you completed their Leadership Training Course. This certificate can be listed on your resume. It is not necessary to volunteer for this training to participate in this study. Taking the survey today and the survey again in 4 weeks will be enough to receive your extra credit in Comm 395. If you would like to volunteer to be one of the students to receive the FREE Leadership Training, indicate below by selecting yes. Within a few days, you will receive an e-mail with further instructions on how to download the software and how to begin your leadership training. You will have the entire month of October 2014 to complete the 12 hours. The

next survey will be given in the first week of November. Please answer the following question to let us know if you would like the additional training.

Would you like to complete the computer leadership simulation training program (VLeader) being tested in this study?

- ❍ No Thank you. I do NOT want the extra leadership training. (1)
- ❍ Yes! I will spend at least 12 hours using the leadership training program in the month of October 2014 (2)

Answer : No Thank you. I do NOT want the extra leadership training.

Q48 Thank you for completing this survey. You will receive a reminder next month to complete the second survey. Please click on the arrow to exit the survey.

Answer: Yes! I will spend at least 12 hours using the leadership training program

Q49 Thank you for volunteering to take the leadership training program. You will receive a link via e-mail in the next few days with further instructions. We look forward to working with you during the next month as you increase your leadership skills! Now, hit the arrow to exit this survey.

Appendix G: Biographies for David Whetten and Kim Cameron

Brief Biographies for David A. Whetten and Kim S. Cameron, authors of the *Developing Management Skills* textbook. These are the bios provided by the text book publisher.

"David Whetten- Prior to joining the Marriott School of Management faculty in 1994 Dave was on the faculty at the University of Illinois, Urbana-Champaign, for 20 years, where he served as Associate Dean of the College of Commerce, Harry Gray Professor of Business Administration, and Director of the Office of Organizational Research. He currently serves as the Editor of the Foundations for Organizational Science, an academic book series, and from 1988-90 he served as Editor of a professional journal, the Academy of Management Review. He has published over 50 articles and books on the subjects of performance. He is one of the co-founders of the Center for Positive Organizational Scholarship at the University of Michigan and has served as Dean at the Weatherhead School of Management at Case Western Reserve University, Associate Dean in the Marriott School of Management at Brigham Young University, and department chair at the University of Michigan."

"Dr. Kim Cameron's past research on organizational downsizing, organizational effectiveness, corporate quality culture and the development of leadership excellence has been published in more than 120 academic articles and 13 scholarly books, the latest of which are *Diagnosing and Changing Organizational Culture* (Jossey Bass), *Positive Organizational Scholarship* (Berrett-Koehler), *Leading with Values* (Cambridge University Press), *Competing Values Leadership* (Edward Elgar), *Making the Impossible Possible* (Berrett Koehler), and *Positive Leadership* (Berrett Koehler). His current research focuses on virtuousness in and of organizations--such as forgiveness, gratitude, kindness, and compassion--and their relationship to interorganizational relations, organizational effectiveness, organizational decline, organizational identity, and management education. His management text, Developing Management Skills was recently adapted for the European market under the title, Developing Management Skills for Europe. This pioneering work in management skill education earned Dave and his co-author, Kim Cameron, the David Bradford Distinguished Educator Award from the Organizational Behavior Teaching Society in 1992. Dave has been very active in his professional association, the Academy of Management. In 1991, he was elected an Academy of Management Fellow, in 1994 he received the Academy's Distinguished Service Award, and in 1996 he was elected to a five-year term as a national officer in the Academy. He is also an active management trainer and consultant, having worked with a variety of profit and non-profit organizations, and several major businesses including Caterpillar and State Farm. He teaches classes and workshops on strategy implementation organizational change, organizational values, and a variety of managerial skills, including motivation, conflict management, team building, and communications."